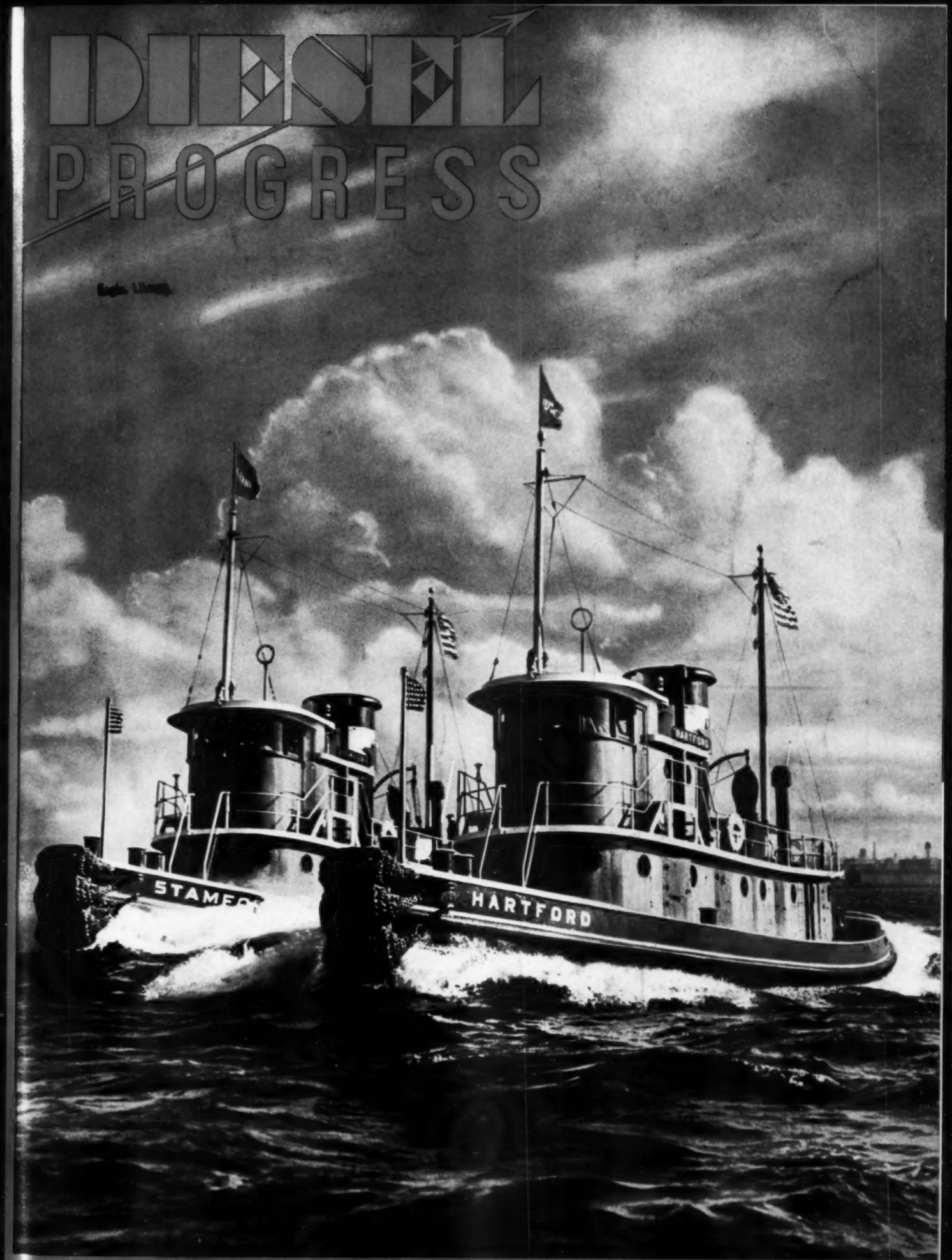
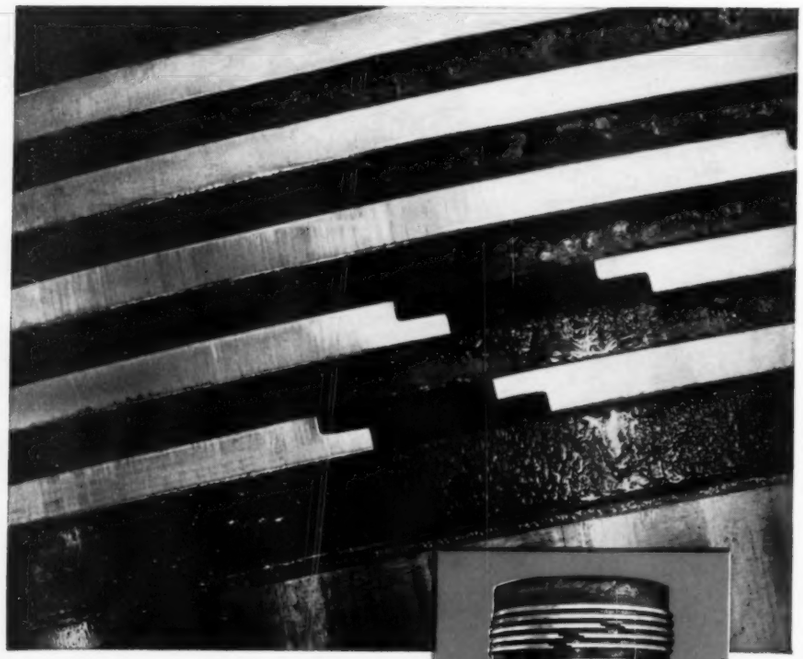
DIESEL PROGRESS



FEBRUARY, 1942

Focusing on FREE RINGS



after thousands of hours

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The reason is—*Texaco Algol* and *Ursa Oils* are highly resistant to the formation of gum, sludge and hard carbon. The little carbon that may form is soft and fluffy . . . will not build up around the rings.

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More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

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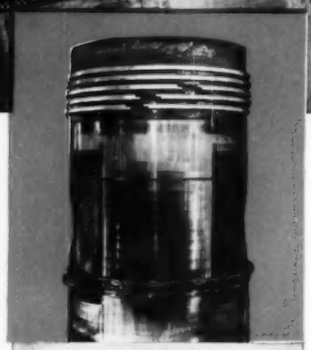

UNRETOUCHED PHOTO of piston from 1200 hp. McIntosh & Seymour Diesel lubricated exclusively with Texaco. After many thousand hours of operation, every ring is free in its groove, clear of hard carbon deposits.

THEY PREFER TEXACO

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

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★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

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TEXACO Lubricants and Fuels

FOR ALL DIESEL ENGINES

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for War Needs.

DIESEL PROGRESS for February, 1942. Volume VIII, Number 2. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1934, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: United States and Possessions $3.00. Canada and all other countries $5.00 per year. Single copy price 25 cents in U. S. A., 50 cents for all other countries.

DIESEL and GAS ENGINE PROGRESS

REX W. WADMAN
Editor and Publisher

FRONT COVER ILLUSTRATION: The sister tugs *Stamford* and *Hartford,* from the yard of Ira S. Bushey & Sons, were recently added to the fleet of Red Star Towing & Transportation Company for service in New York Harbor. Fairbanks-Morse Diesels supply both main and auxiliary power on these vessels. See pages 29 through 31 of this issue for details.

TABLE OF CONTENTS ILLUSTRATION: This Caterpillar Diesel tractor belonging to the U. S. 36th Field Artillery is shown on maneuvers near Kershaw, South Carolina, hauling a 30,000 lb. gun. This unit travels about fifty miles a day.

DIESEL PROGRESS for January, 1942, Vol. VIII, No. 2. Published monthly by Diesel Engines, Inc., 2 West 45th St., New York, N. Y. Tel. MUrray Hill 2-7333. Subscription rates: U. S. A. and Possessions $3.00 per year; 25c per copy. All other countries $5.00 per year; 50c per copy.

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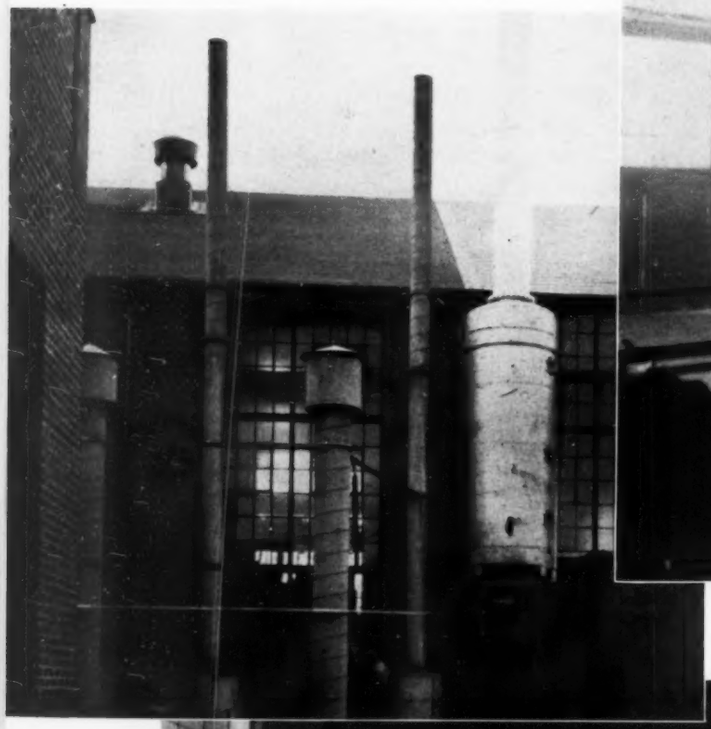
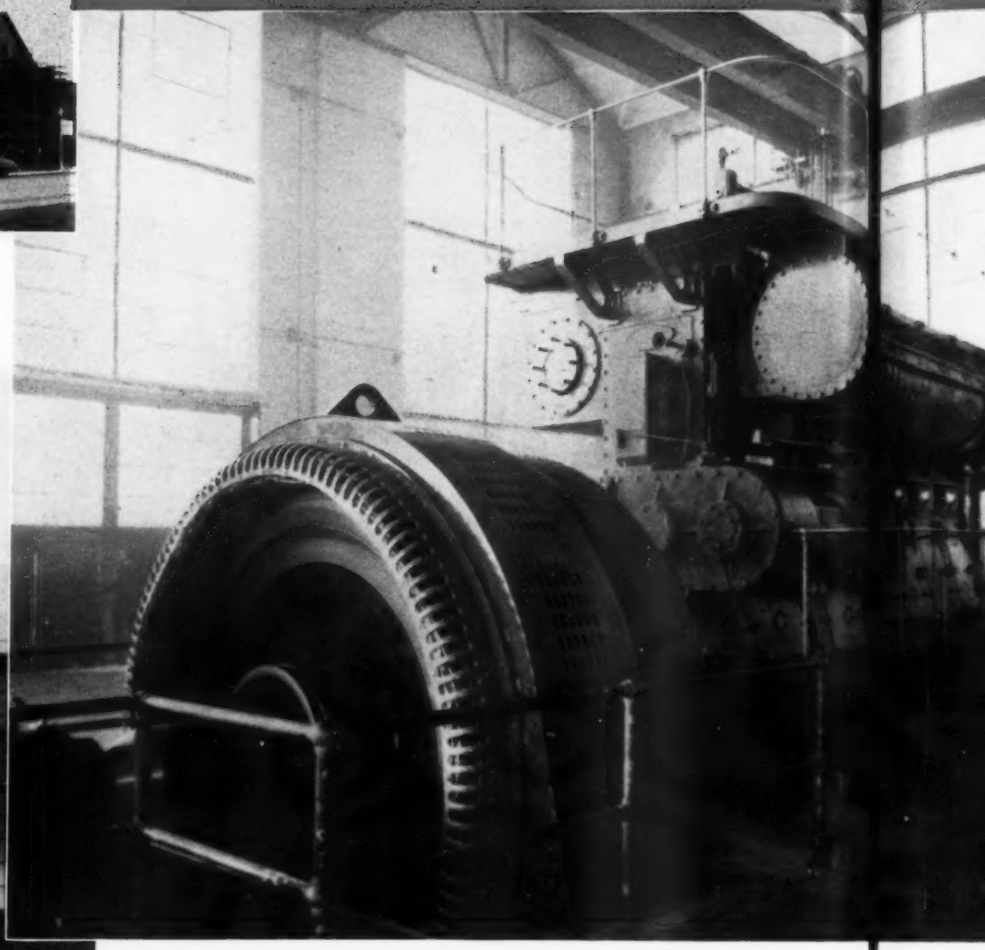
FEBRUARY CONTENTS

FREEPORT, LONG ISLAND..... 24
DIESEL TUNA CLIPPER "NORTH AMERICA"... 28
DIESEL TUGS "STAMFORD" AND "HARTFORD" 29
GAS ENGINES IN DALLAS GAS BUILDING..... 34
DIESEL LOCOMOTIVES FOR THE HIAWATHAS 36
DIESEL FISHERS AND WORK BOATS..... 38
GRAFTON, NORTH DAKOTA..... 40
DIESELS IN HEAVY GOING..... 42
TURBO-CHARGED DIESEL LOCOMOTIVES..... 44
SUPERVISING AND OPERATING ENGINEERS' SECTION 46
DIESEL PATENTS 61

The Freeport plant houses nine Diesel units. The Foster Wheeler cooling tower, seen above, handles eight of the Diesels. The right-hand unit in the view below is the Burgess exhaust Snubber on the new Busch-Sulzer engine.





Newest unit in the Freeport plant, a Busch-Sulzer 3060 hp. Diesel and Westinghouse alternator.

General engine room view with the new unit in the foreground.

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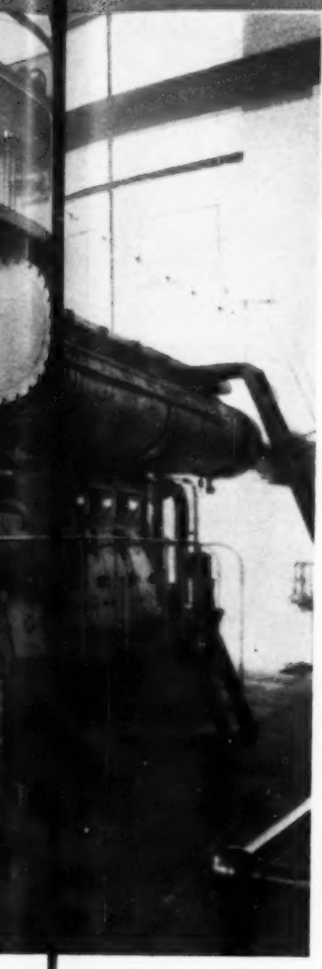
FREEPORT, L. I.

By WM. H. GOTTLIEB



THE Freeport, Long Island, power plant, largest municipal Diesel plant east of the Mississippi, has maintained its leadership in the field with the installation in December of a 3000 hp. Busch-Sulzer engine. This unit is the ninth Busch Diesel in the Freeport plant and raises the total capacity of this plant to nearly 10,000 kw. This plant has all the elements of a proving ground for Diesels in municipal service. Each successive installation reflects modern improvements in design; performance records through the years attest to engine durability and operating economy. It is not size alone that makes this plant outstanding: its history rates it as one of the early municipal Diesel plants.

Freeport pioneered in municipal electric production, constructing its first power house in 1898 as a steam pumping station for the village water system. By the end of the first World War, the plant had three steam engines with a combined capacity of 600 kw. and peak load during the winter of 1920-21 required operation of all three engines. In May, 1921, the village placed in operation its first Diesel, a 250 kw., 4-cycle, air-injection Busch-Sulzer engine. This unit made a remarkable record of savings as compared to the steam plant and, so, two additional engines, each rated at 500 kw., were installed, one in 1923 and the other the following year. The plant continued its phenomenal growth, adding two 750 kw. Diesels in 1927 and a 1050 kw. unit in 1929. To this point all but the first engine were slow speed, two-cycle, air-injection Diesels of the cross-head type with attached reciprocating scavenging pump and air compressor.

A 3000 hp., mechanical-injection Busch Diesel, the first of its type installed in the United States, was put into operation at Freeport in November, 1932. In April 1936, a second 3000-hp. unit, a commercial duplicate of No. 7, was put in service and the small No. 1 unit was sold to make room for it. December, 1941, now takes its place among the notable dates in Freeport power history. The sizes of engines installed are themselves evidence of the vast expansion of this community's power service but the figures on load and production are worth citing. In 1921, total generation was just under 2,000,000 kwh. while, in 1940, the corresponding figure was over 16,000,000 kwh. In 1929, with the plant well along in its development, the peak load was 2900 kw. In 1941, the peak was over 5700 kw.

Major interest today centers on the new engine, Busch-Sulzer's latest model of its two-cycle, trunk piston, mechanical-injection type. It is a 9-cylinder engine of 21½" bore and 27½" stroke and develops its rating of 3060 hp. at 240 rpm. The older engines of this horsepower have ten cylinders of smaller bore and stroke but the M.E.P. at contract rating has been kept constant at only 61.8 lbs. per square inch. The piston speed has been increased for the new model from 1080 to 1100 feet per minute. The new unit represents a distinct advance, for the separate motor-driven scavenging blower of the old type has been replaced with a built-in gear-driven rotary-type blower in four units at the side of the engine. This has the advantage of saving space and piping and makes the engine a self-contained unit which can be started cold without first having to start a motor-driven blower from another source of power.

Air for the new engine is drawn through a stack to a 24-unit air filter mounted on a steel frame in an underground concrete chamber. The filtered air passes through a large horizontal Snubber in the plant basement and then up through a header to the scavenging blowers which pump directly into the engine air receiver. The long established Sulzer system of double port scavenging is employed and it will be noticed that, in effect, there is some slight supercharging of the cylinder by the scavenging blower at the beginning of compression after the exhaust port is covered and while the top row of inlet ports is still open. The blower is driven off the crankshaft by a train of herringbone gears with journals mounted on roller bearings.

The fuel injection system has been developed by the Busch-Sulzer Bros.-Diesel Engine Co. in connection with the Aircraft and Diesel Equipment Co. over the last three or four years and, essentially, comprises an improvement in water cooling of the lower end of the fuel valve, as well as simplification in the individual high-pressure injection pumps. This system was designed to anticipate the need of burning heavy fuels such as have been handled successfully in the past only by air-injection engines. Freeport uses a 21 gravity oil for both air-injection and mechanical-injection units. The plant already had five storage tanks with a combined capacity of 100,000 gallons and it was not thought necessary to expand storage facilities. Fuel is transferred to day tanks inside the plant by three motor-driven pumps in a house near the storage tanks. These pumps are arranged for remote control from the plant. In addition, there is an air-driven pump and a hand pump. There are four alternate lines from storage to the day tanks and an emergency pumping system inside the plant. Fuel for the new engine passes through a strainer and meter before reaching the 250 gallon elevated day tank on the engine room

wall. The fuel then goes through a duplex filter to the individual injection pump for each cylinder. The governor, of the isochronous type, regulating the quantity of fuel delivered to the cylinders by the injection pumps.

A rotary pump, chain-driven from the crankshaft, supplies lubricating oil under pressure to the main bearings, crankpin and wristpin bearings, camshaft bearings, fuel pump driveshaft bearings and gears, fuel pump cam rollers and govenor drive mechanism. Oil is drawn from the sump tank through a strainer and then sent through a cooler to the engine. A plentiful supply is pumped to the pistons to serve as a cooling agent. Part of the oil is taken from the sump to an activated clay purifier which operates continuously and keeps the entire oil charge free of contamination. The plant contains a motor-driven auxiliary lube pump capable of serving the pressure lubricating system in emergency. The pump is used regularly to keep pressure up in starting and stopping the engine.

Eight Nathan mechanical lubricators supply oil to the cylinders through 86 individual feeds and there is a separate plunger for each feed. The lubricators are fed from a small tank on the side of the engine and the feeds are arranged to give the operator actual view of oil on its way to the cylinders. Scraper rings catch the cylinder lubricating oil and drain it to a special tank so that it may be purified before it is returned to the lubricator supply tank.

Busch-Sulzer's exclusive three piece piston used in this engine is known for its solid forged piston top, the long, light-weight piston skirt with walls unpierced by piston pin, and the piston pin housing which goes inside the skirt and supports the piston pin with bearing on the top side of the pin for its full length. The pin is securely fastened to the capped end of the rod and, accordingly, oscillates with the rod. The advantage of this construction is that it gives increased bearing area for the piston pin and, consequently, much lower pressure per square inch of its projected area.

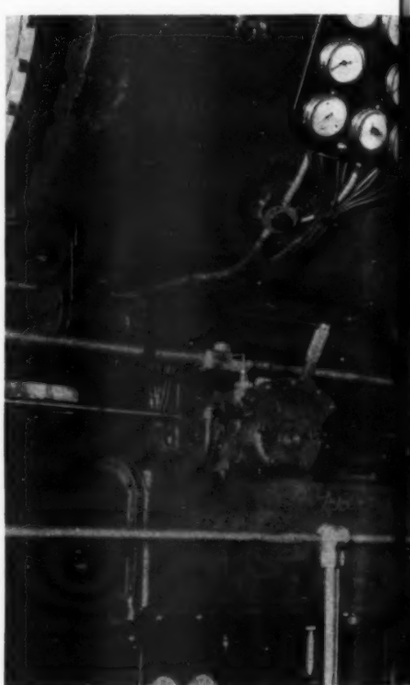
The cooling water system at Freeport, served by an atmospheric tower on the roof, was already overtaxed before the latest plant expansion and so it was decided to provide a separate system for the new unit. With care and fore-thought typical of the planning of this installation, the engineers arranged for several alternate cooling circuits, thus insuring an adequate supply of cooling water at all times. The ultimate system, which will be in use virtually all the time, is of the closed type. Water will be circulated through the engine jackets and a shell-and-tube heat exchanger by a motor-driven centrifugal pump. A second such pump will take raw water supplied by the wells on plant property and put it through the heat exchanger. Plans are being considered for pumping this water back into the ground. The main emergency system consists of a 10,000 gallon cistern with its own motor-driven circulating pump to send water through the engine. It is possible to bypass part of the circulating water around the cistern so that the jacket temperature can be controlled closely. The third alternative calls for a direct flow of water from the wells through the engine jackets. Finally, as a last resort, it will be possible to put city water through the engine under city pressure. It is the custom in this plant to treat the jacket water with a softener.

Automatic relief valves are provided in each cylinder for safety, and convenience when making adjustments. There is an automatic safety shutdown in case the lubricating oil pressure drops below a predetermined level, also an overspeed safety stop. This device acts directly on the fuel pump control shaft, stopping delivery of fuel to the cylinders. In addition, a horn signal is sounded for excessive temperatures in cooling water and lube oil. The operator has ample opportunity to learn the condition of the engine before it reaches the alarm stage. A gauge board on the control side of the engine gives information on the following pressures: starting air, scavenging air, fuel to strainer, fuel after strainer, cooling water to engine, piston cooling oil to engine, lube oil inlet, lube supply, jacket water supply and jacket water discharge. In addition, there is a full set of dial-type thermometers on piston oil discharge and bearing lube. A multipoint exhaust pyrometer gives exhaust temperature at each cylinder.

Exhaust gases pass from the header straight out through the rear wall of the plant to a vertical Snubber outside. One feature of the engine installation is a built-in electric barring device which is reversible and has two speeds and an interlock with the starting mechanism. Starting air for this engine is drawn from the general plant supply provided by a motor-driven compressor.

The new engine is connected directly to a 2675 kva., 4000/2300 volt, 80% pf., 3-phase, 60-cycle, Westinghouse generator. The 40 kw., 125 volt, exciter is driven by V-belts. A new panel was added to the plant's extensive switchboard to accommodate the new engine. This panel holds the usual instruments, a voltage regulator, a synchronizer and the governor remote controls.

Manager and Chief Engineer of the Freeport plant through the years of its major development has been Thomas F. Dunn, himself a pioneer in the Diesel industry. Mr. Dunn has had long experience with Diesel engines, taking part in construction of the original Hornsby-Akroyd engine, fore runner of the American Diesel. This engine is now on exhibition in the Smithsonian Institute. He worked on



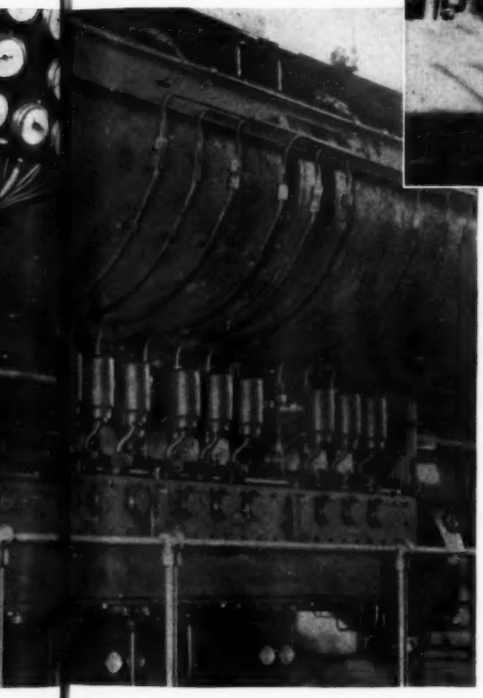
experimental engines and later engine production, serving in an executive capacity with De la Vergne, Busch-Sulzer and other engine builders before coming to Freeport in 1929 as Director of Diesel maintenance. One of Mr. Dunn's achievements in Freeport has been the development of a system of maintenance records which has reduced repair costs and insured maximum service of engine parts and accessory equipment.

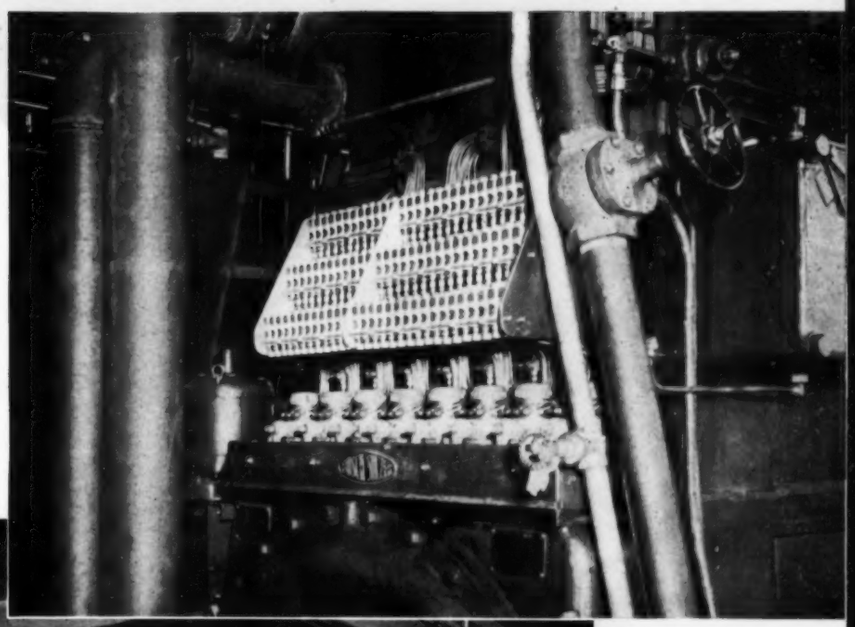
It is this combination of experience, initiative and foresight that has made Freeport one of the largest, best-equipped, and most efficient municipal plants in the United States.

Equipment trade names include many of the best known in the industry. The governor is

Intake side of the new engine showing built - in scavenging blowers.

Close-up of Adeco fuel injection system especially adapted to handle heavy fuels.

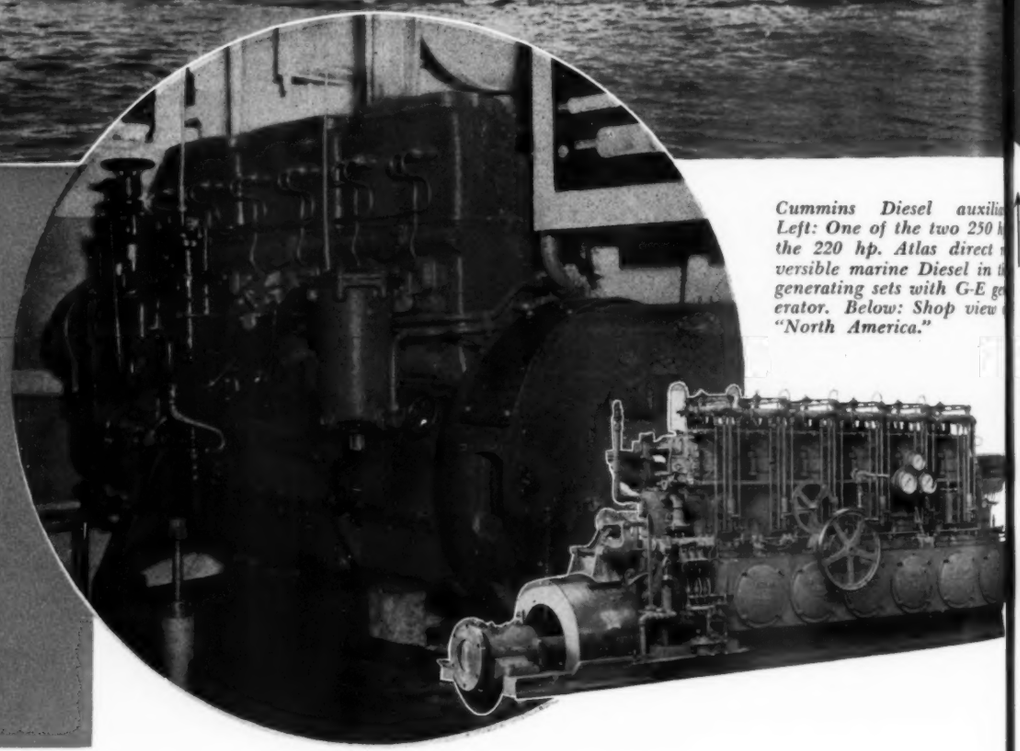




Woodward, the piston rings American Hammered, the heat exchanger and oil cooler are Ross, the main lube pump Kinney, and the lube priming pump Schutte & Koerting. The intake air Snubber and the exhaust Snubber are Burgess, the air filters American and the exhaust pyrometer Brown. The Galena Oil Co. lube is purified in a Crane reclaimer; the fuel is Colonial Beacon, the fuel filter Purolator, the fuel meter Brodimatic, the fuel injection pumps Adeco. The cylinder lubricator is a Nathan. The cooling water pumps are Dayton Dowd, the water and oil alarms Westinghouse. Oakite Airefiner is used to soften water. Thermometers are Motoco and Weston, and pressure gauges—Marsh. The voltage regulator and switchboard instruments are General Electric, the air compressor Ingersoll-Rand.

Close-up of the eight Nathan valveless mechanical lubricators serving 86 different points in the engine.

Partial view of the extensive General Electric switchboard.



TUNA CLIPPER "NORTH AMERICA"

By JIM MEDFORD

Cummins Diesel auxilia... Left: One of the two 250 h... the 220 hp. Atlas direct ... versible marine Diesel in t... generating sets with G-E ge... erator. Below: Shop view ... "North America."

Chester Sa... Red Star ... portation ... York, pro... Bushey-bu... Diesel equ...

One of t... bodying t... and equip... pleted by... Star.

NORTH AMERICA, another San Pedro, California, built tuna motor vessel, recently joined the San Diego short range fishing fleet. Powered with an Atlas Imperial six cylinder, 10″ bore, 13″ stroke, 4 cycle direct reversible marine Diesel developing 220 hp. at 335 rpm., the all wood ship is 72′ overall, 20′ 6″ beam, with a moulded depth of 9′-6″ and a capacity of 64 tons of fish in brine and ice refrigeration. Built by Al Larson Boat Works, Terminal Island, from designs by Adolph Larson, naval architect, for Captain A. Ghio and a group of San Diego fishermen, the vessel has airy quarters for crew of ten, large galley and mess room, and bait tanks on main deck. The combination wheelhouse, chartroom, radio shack and master's quarters are on the boat deck. Amidships are stowed the power dory and net skiff used in bait seining.

Fuel bunkers for 6,000 gals. are fore and aft instead of in the usual wing tanks, permitting the placing of the two Cummins Diesel generating sets one either side of the main engine. These are 250 hp., direct connected to 50 kw., 400 amp., D.C. generators supplying power for the two 4½″ by 4½″ ammonia compressors; bait, service and bilge pumps, engine air-starting compressor, and deck machinery. The cargo space is divided into three separate holds; the after hold for iced fish, the two forward holds for sharp frozen refrigeration.

In addition to the main Atlas Imperial and Cummins Diesel auxiliaries, the other items of equipment include: generators by General Electric; Fairbanks-Morse pumps and motors; Vilter refrigeration machinery; dory powered by a Gray 4 cylinder 22 hp. marine Diesel; fathometer by Submarine Signalling Co.; 24-volt batteries by Hobbs; fuel transfer pump by Westco; CO_2 fire equipment; Worthington engine-air compressor; switchboard by Ets-Hoken and Galvan; exhaust pyrometer by Alnor; fuel oil by Shell Oil Co.

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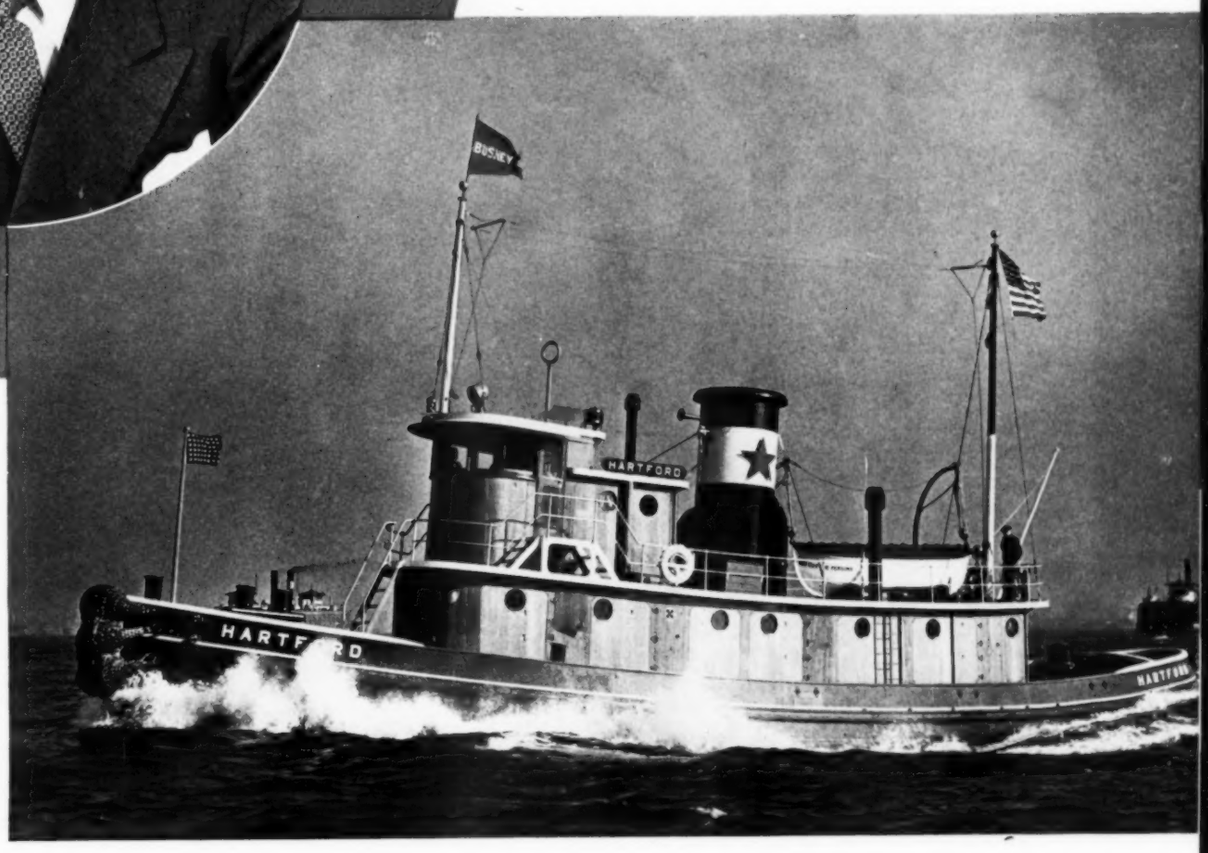
TWO MORE BUSHEY TUGS FOR RED STAR FLEET

By HENRY A. STEPHENS

Chester Sanders, President of Red Star Towing & Transportation Company of New York, proud owners of four Bushey-built, Fairbanks-Morse Diesel equipped tugs.



One of two sister tugs, embodying the finest of design and equipment, recently completed by Bushey for Red Star. →

FROM the bustling yards of Ira S. Bushey & Sons of Brooklyn, New York, recently came two sturdy tugs for the fleet of the Red Star Towing & Transportation Company of New York City, continuing the long standing and successful association of the Red Star people and Fairbanks-Morse Diesel-engined, Bushey-built tugs. The story of the Red Star Towing & Transportation Company itself, and its President, Chester H. Sanders, is an American success story, and the present status of this firm in the towing field exemplifies such American ideals as courage, initiative and vision. In the early days, New York towing work was conducted by tugs which were owned and operated by numerous "captains" who might own anything from a sixteenth to a quarter share in the vessel. It was a condition similar to that found in the commercial New England fishing fleet today.

Red Star began with such a partnership when, in 1874, Captain William E. Barber and Captain John L'Hommedieu teamed up in a towing venture in New York harbor. In 1890, they were joined by Captain Samuel H. Sanders, father of the present Red Star president. Captain Sanders was placed in charge of their third tug, the *Eastchester* and his partnership with Captains Barber and L'Hommedieu began to enlarge radically the scope of Red Star's activities. In 1905, the loosely knit organization of the three captains was firmly established into the Red Star Towing & Transportation Corporation.

Typical of the pioneering spirit of these men, was the designing and adopting of vessels for operation in shallow water creek towing on Long Island Sound, a field in which past activity was impossible. Captain Sanders' son, Chester, was deeply interested in this business in his boyhood days, and from his earliest years spent week ends and holidays on board his father's tugs.

After less than a year of diligent work with another towing line, young Sanders joined Red Star and worked his way up until he became thoroughly familiar with all departments of a towing line. His native ability quickly brought success and he was made Secretary in 1917. Shortly afterwards, he left for France where he served a year in the armed forces. When he returned he was placed in complete charge of the office and his particular task was the organization and development of the College Point Dry Dock & Supply Company.

Mr. Sanders' record shows that his energy and vision was bound to bring him to the firm's presidency, which was achieved in 1939.

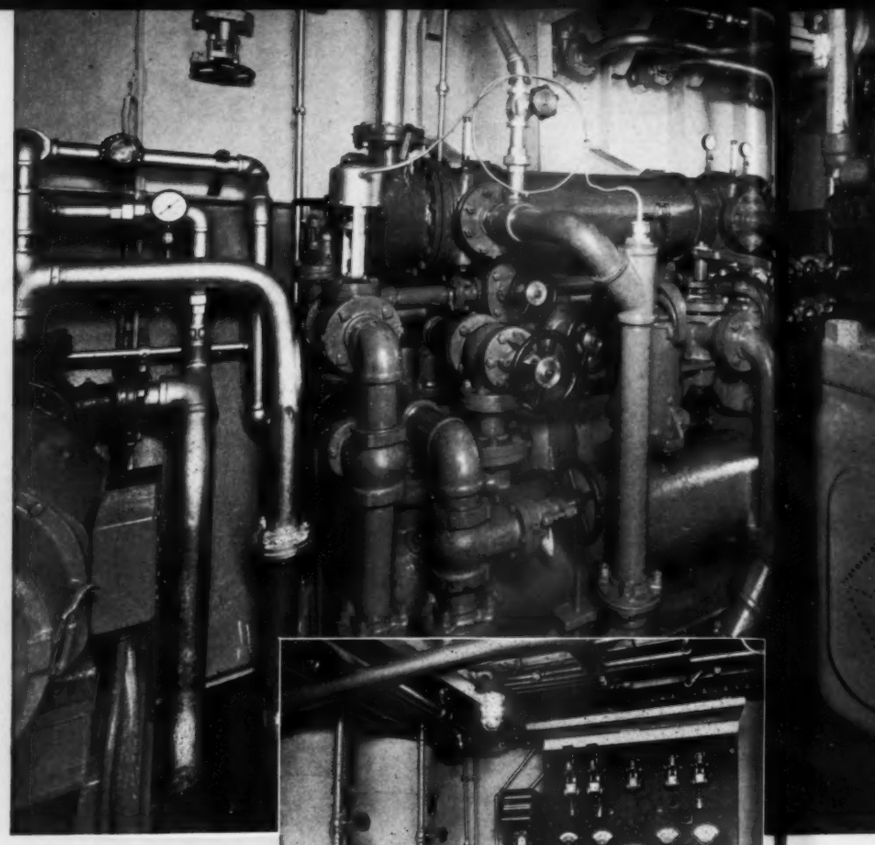
Red Star's interest in Bushey-built tugs was aroused in 1937, the year that the widely heralded Bushey tug *Carmelite* was finished. Even prior to the completion of this tug, Red Star, after a thorough analysis of the vessel and her plans, was so impressed that it placed an order with Busheys for a duplicate of the *Carmelite* to be named the *Flushing*.

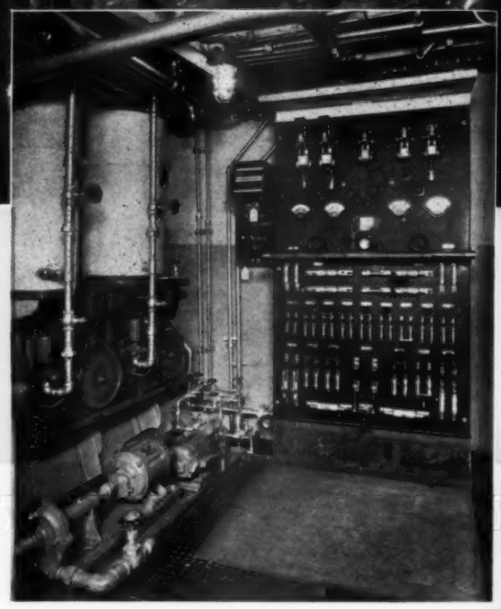
After entrance of the *Flushing* into Red Star service, the fine record she achieved and the many modern features incorporated on her caused the next unit of the Red Star fleet to be a similar Bushey-built tug, the *Chaplain*—later named *Providence*. The records made by these tugs caused Red Star to add the *Stamford* and *Hartford*, two sister ships to its fleet.

Mr. Sanders, on the trial trip of the *Hartford*, expressed great pleasure with her construction and equipment and voiced every confidence that she would even surpass their original expectations.

These two new 90-footers are of all welded steel with a 22.6 ft. beam and an 11 ft. draft, and utilize a Ferguson three blade bronze propeller. They are built in the traditional Bushey style, which means the finest of equipment and appointment. The lower engine room—always the starting point for the tug visitor, is of the spacious proportions and clean arrangement.

These sister ships are each powered with a Fairbanks-Morse 7-cylinder, 14″ bore x 17″ stroke, 805 hp., 300 rpm., 2-cycle, airless injection, direct drive, direct reversible, starboard propulsion marine Diesel engine, fitted with oil-cooled pistons, open head combustion, differential injection valves, back-flow scavenging, and twin Nugent fuel oil strainers. An





Two lower engine room views showing Schutte & Koerting duplex strainer and heat exchangers, above, and service pumps, air compressors and electrical distribution panel, right.

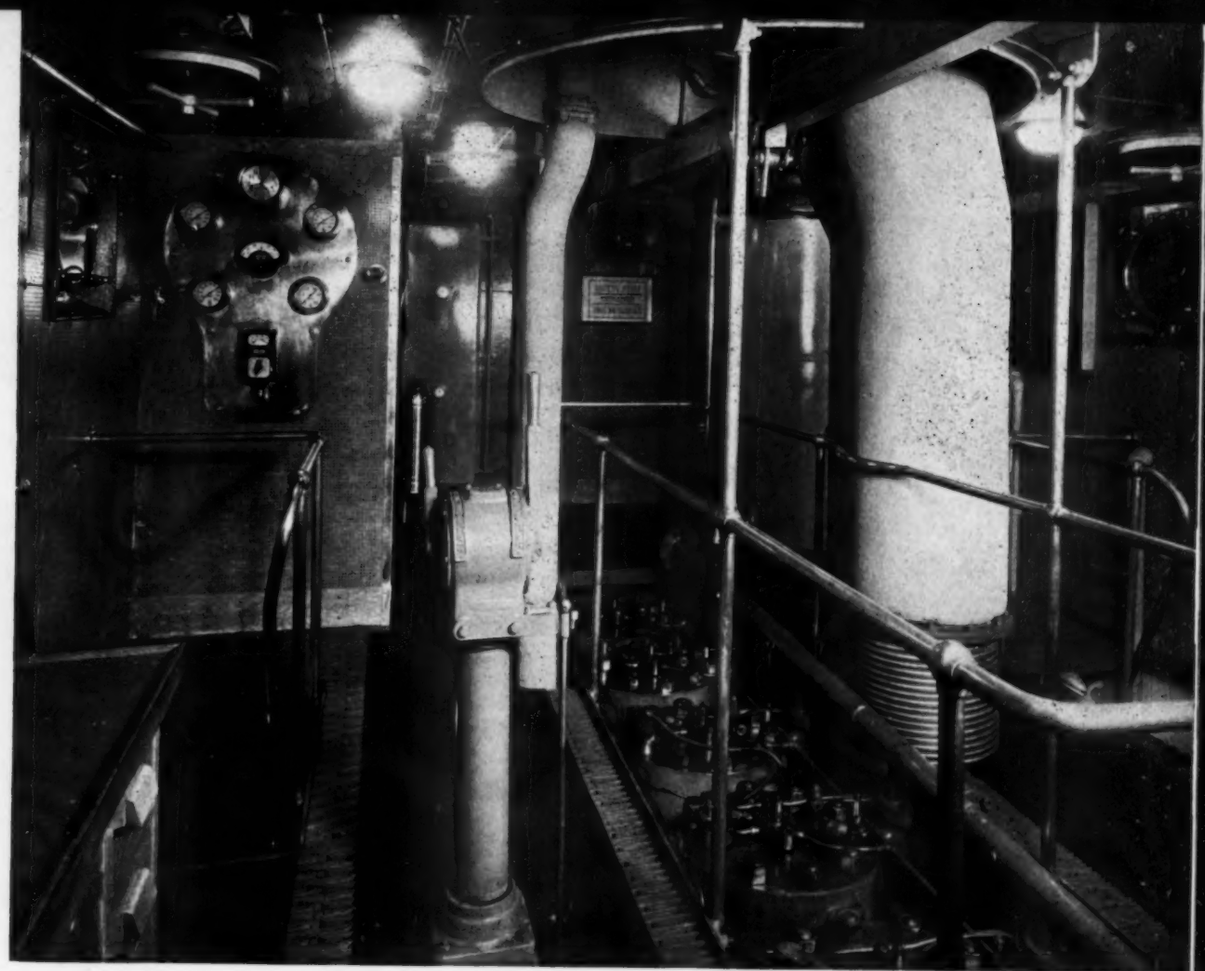
Electro-Dynamic, 20-kw. 125-volt D.C. tailshaft generator is driven off the F-M main engine flywheel by a V-belt drive.

The 20-kw., 125 volt D.C. Diesel generating set consists of a 4-cylinder, Fairbanks-Morse 4¼″ bore x 6″ stroke basic marine Diesel engine rated 32 hp. at 1200 rpm. and an F-M 20 kw., 125 volt marine type generator with flexible coupling all of which together with the Maxim exhaust silencer, water cooled exhaust manifold, lubricating oil pump, lubricating oil filter, air start motor, fuel supply pump, cleanable type fuel filter and circulating water pump and adapter are mounted on a common steel subbase.

The auxiliary set consists of a 2-cylinder Fairbanks-Morse 4¼″ bore x 6″ stroke, 20 hp., 1200 rph. marine Diesel clutch connected to a Northern 150 gpm. bronze fitted rotary pump, clutch connected through a Link Belt speed reducer to a Gardner Denver 43 cfm. 2-stage water cooled Duplex air compressor. This entire limit is mounted on a common sub-base. A Maxim spark arrestor silencer handles the engine exhaust.

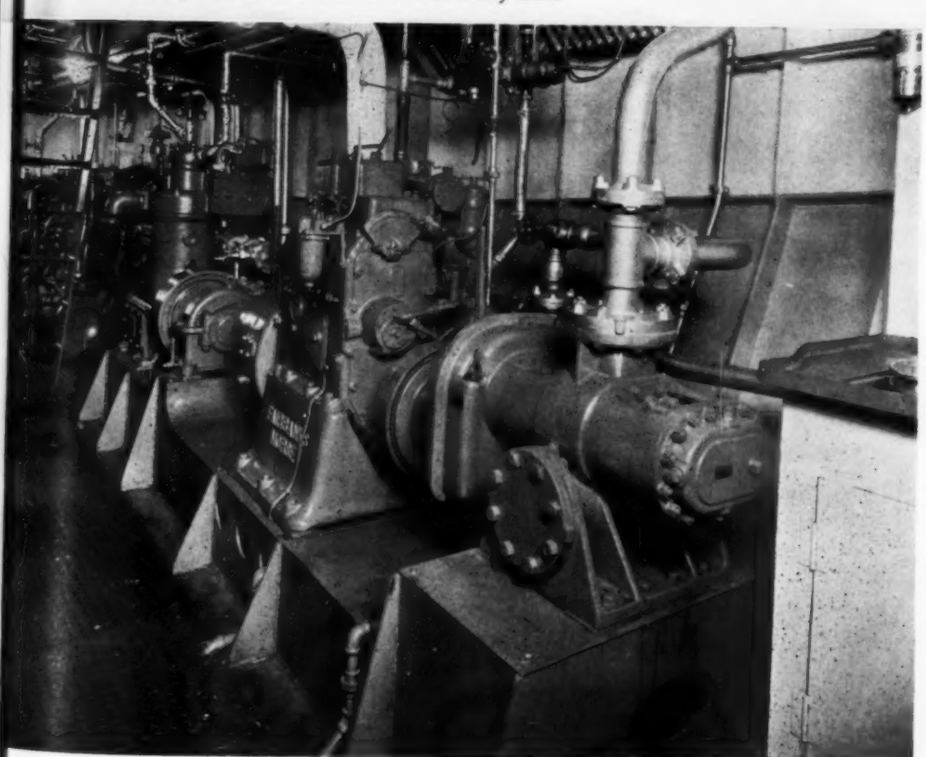
In addition to the regular accessories built into the Fairbanks-Morse main engine, there are such familiar items as the before and after pumping unit, consisting of a Roper 120 gpm. rotary lube oil pump and an F-M 250 gpm. centrifugal water pump with an F-M 10-hp., 125 volt marine type motor. The heat exchanger, duplex oil strainer and lube oil cooler are all of Schutte & Koerting manufacture. Both the intake and exhaust silencer equipment is of the Maxim spark arrestor

. . . . . *And now please turn to page 51*

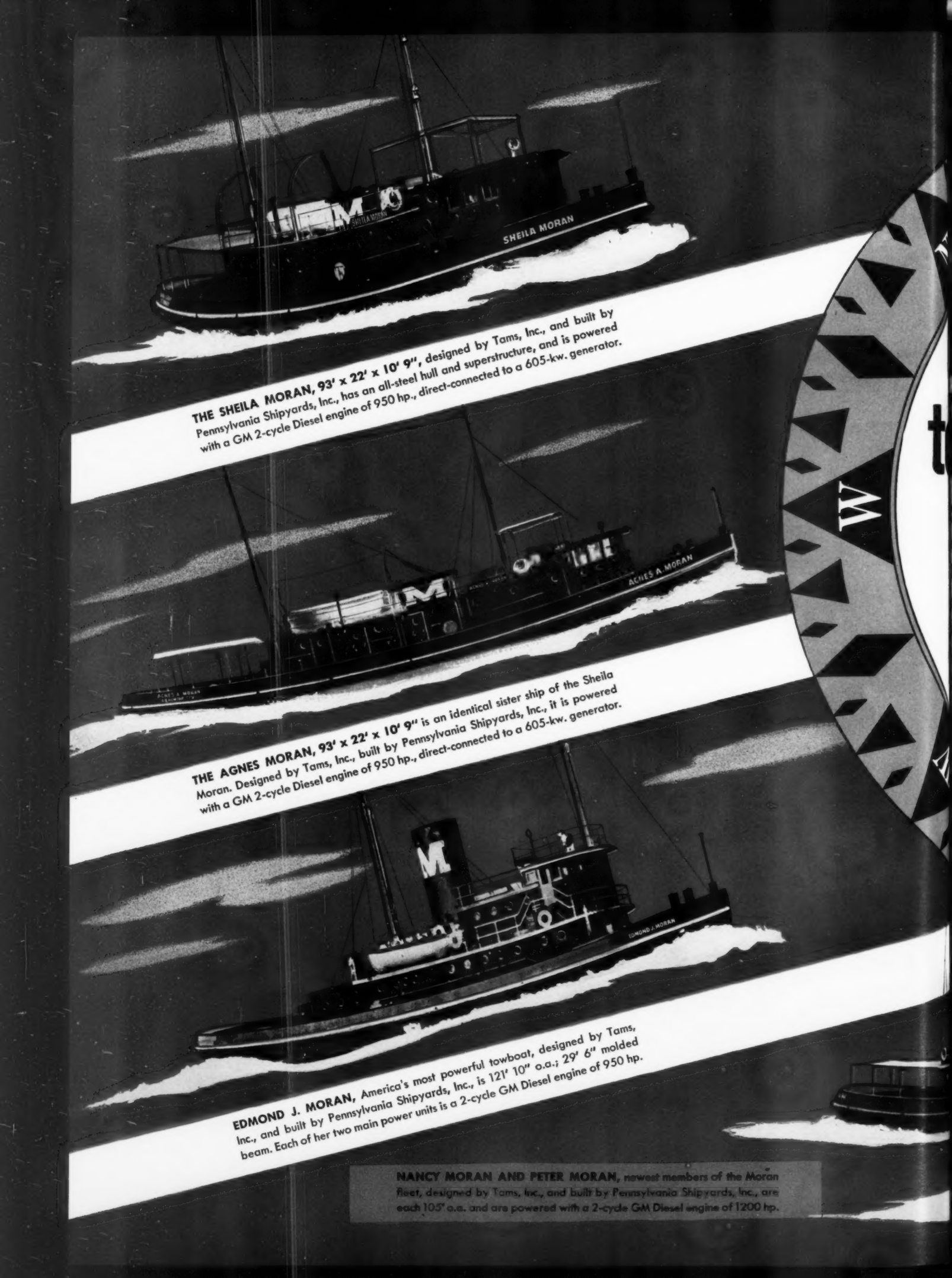


Upper engine room view showing cylinder heads of the F-M Main Diesel, remote engine control stand and gauge panel with Weston tachometer, Brown pyrometer.

One of the two F-M Diesel-driven auxiliary units.



Operating side of the F-M propulsion Diesel. Note Nugent duplex fuel oil filters under hand wheel.



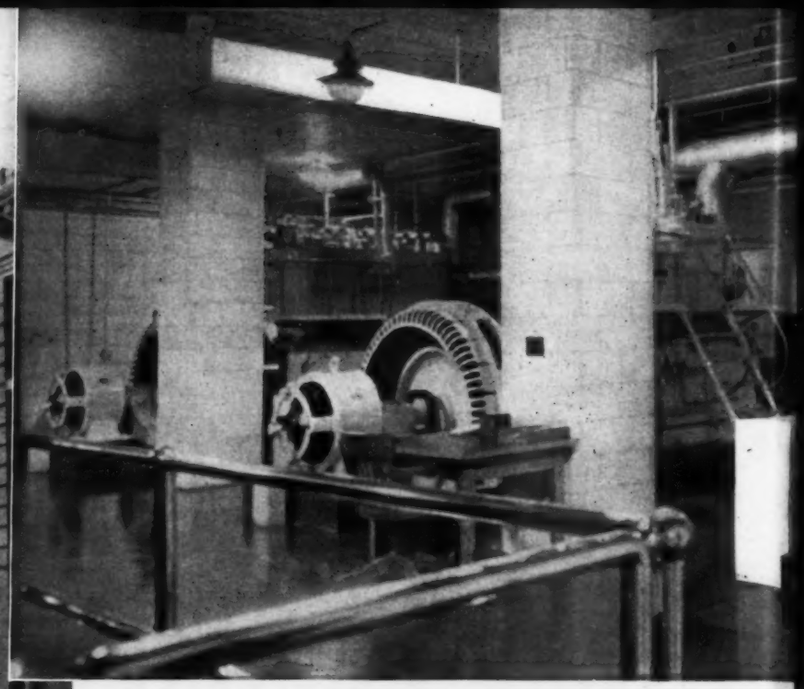
THE SHEILA MORAN, 93′ x 22′ x 10′ 9″, designed by Tams, Inc., and built by Pennsylvania Shipyards, Inc., has an all-steel hull and superstructure, and is powered with a GM 2-cycle Diesel engine of 950 hp., direct-connected to a 605-kw. generator.

THE AGNES MORAN, 93′ x 22′ x 10′ 9″ is an identical sister ship of the Sheila Moran. Designed by Tams, Inc., built by Pennsylvania Shipyards, Inc., it is powered with a GM 2-cycle Diesel engine of 950 hp., direct-connected to a 605-kw. generator.

EDMOND J. MORAN, America's most powerful towboat, designed by Tams, Inc., and built by Pennsylvania Shipyards, Inc., is 121′ 10″ o.a.; 29′ 6″ molded beam. Each of her two main power units is a 2-cycle GM Diesel engine of 950 hp.

NANCY MORAN AND PETER MORAN, newest members of the Moran fleet, designed by Tams, Inc., and built by Pennsylvania Shipyards, Inc., are each 105′ o.a. and are powered with a 2-cycle GM Diesel engine of 1200 hp.

MORE POWER
tWartime Commerce
oday, Moran towboats are doing an out-
anding job in speeding the movement of
ips and goods in the nation's vast war pro-
am. And the 11 most powerful Moran tugs, 5
which are now in the Navy, are General
otors Diesel-electric drives — including
merica's most powerful commercial towboat.
CLEVELAND DIESEL ENGINE DIVISION
General Motors Corporation
GENERAL MOTORS
DIESEL
NANCY MORAN
NANCY MORAN



Left: The Dallas Gas Building, thirteen story office building, obtains all power and light from three natural gas engines in its basement power plant.
Above: The three 205-hp. Bruce Macbeth gas engines supply power at a cost of 7.6 mills per kilowatt-hour.

DALLAS GAS BUILDING

By WILLIAM H. GOTTLIEB

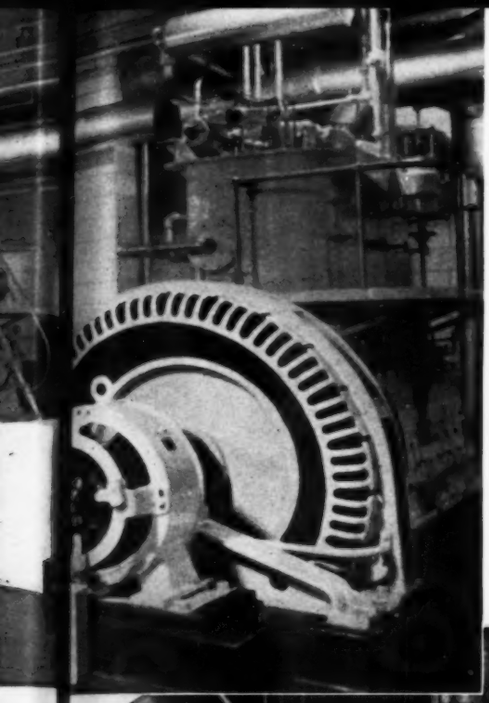
THE Dallas Gas Building, modern thirteen story office building in the heart of Dallas, Texas, and home of the Dallas Gas Company, appropriately uses internal combustion engines burning natural gas to supply all power and lighting requirements. In the ten years since the building was constructed and the plant installed, these engines have made an impressive record of economy. Savings under the prevailing cost of purchased power were sufficient to pay off the entire cost of the plant in less than seven years and, since that time, have returned substantial profits to the company.

The prime movers in this plant are three identical, four-cycle, Bruce Macbeth gas engines rated at 205-hp. each. Each unit has four cylinders with 13½-in. bore and 15½-in. stroke and develops its rated horsepower at 277 rpm. Each drives directly a 187 kva., 240 volt, 80% pf., Westinghouse synchronous generator with 7.5 kw. direct-connected exciter. When the engines were installed in 1931, they had a 12½-in. bore and were rated at 165 hp. It was recognized at that time that an increase in power needs would be required during the life of these engines and so the engines chosen were of a design that would lend itself to an increase in cylinder size and power output. The change-over was accomplished quickly and economically this year and provided the necessary plant expansion for considerably less than the cost of a new engine. Space is at a premium in downtown office buildings and it would have been expensive at best to find room for another power unit. The far-sighted engineers were careful to install original generators sufficiently large to accommodate the intended increase in engine output and, consequently, no change in electrical equipment was necessary.

During the year 1940, the power plant produced 1,050,000 kilowatt hours. Daily peak loads ran up as high as 365 kilowatts. Lighting, three elevators and miscellaneous power demands keep the load at a fairly constant high level throughout the day and evening, and it is necessary to operate two engines from 7:30 a.m. to midnight. For the remaining seven and a half hours, the third engine is run alone. This arrangement, in effect, provides a standby and permits the plant to carry its peak loads even while one engine is being overhauled.

The cost of all power plant operations during the year 1940 was just under $8,000.00 including labor, fuel, lubricating oil, maintenance and miscellaneous supplies. This represented an expenditure of approximately 7.6 mills per kilowatt hour. Nor does the Dallas Gas Company achieve these production economies by giving its plant free gas or even preferential rates. The plant is billed for all gas consumed at the same rates paid by other industrial consumers: 50 cents a thousand cu. ft. for the first 80,000; 28 cents per thousand cu. ft. for the next 220,000; 23 cents for the next 200,000; 18 cents for the next 500,000; and 15 cents per thousand for all over 1,000,000 cubic feet.

In addition to electric power, the engines make a further valuable contribution in the form of waste heat. Exhaust gases from all three units flow into a common header extending along the wall at the control end of the engines.



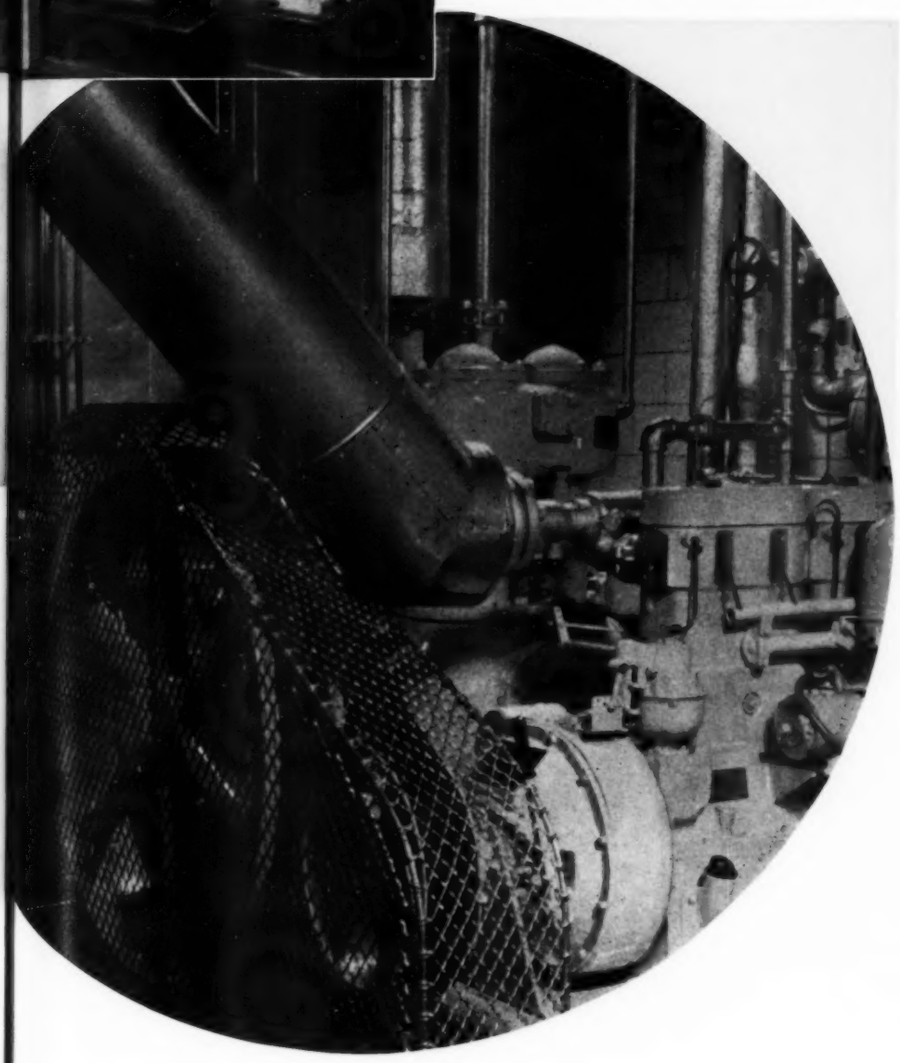
From this header, the hot gases enter the bottom of a large waste heat boiler producing steam which is used to heat water for the entire building, and for various other purposes. Leaving the top of the heater, the gases pass up through a long pipe to the roof and vent through a muffler. When there is no need for the heat, the exhaust can be bypassed around the boiler. The cost of providing this necessary heat by other means was not included in calculating the savings of the gas engine plant.

The engines are lubricated by the splash system and a 30 gravity oil is used throughout the plant. Each crankcase is drained every 2000 hours and Chief Engineer W. F. Gieb reports that virtually no oil is added to the system in the interim. All oil taken from the engines is put through a reclaimer and is used in the company shop for lubricating truck engines. Since the total cost of the oil was allocated to the power plant, it is evident that the operating costs were lower than the figures cited above. Gas of 1050 Btu. per cubic foot enters a header with a line to the mixing valve of each engine where fuel and air are mixed and sent into the cylinders on the suction stroke. Two rotary magnetos for each engine insure prompt ignition. The heating value of the gas is tested continuously by a recording calorimeter in the plant office. Laboratory equipment is on hand so that the calorimeter readings may be checked. The cooling water system is of the open type. Two motor-driven centrifugal pumps send water from the engines up to an atmospheric cooling tower on the roof. From the cooling tower sump the water returns by gravity and circulates through the engine jackets. Starting air for the three engines is provided by two compressors, one motor-driven and one driven by a two-cylinder gasoline engine.

The twelve-panel switchboard is particularly well equipped having recording ammeters, recording kilowatt-hour meters and totalizing kilowatt-hour meters so that the record of plant production is always available. Two vibrating-contact voltage regulators serve the entire plant and a synchronoscope is an important aid in paralleling engines.

To supply air conditioning for the main floor and basement offices, the plant contains a 50 hp., four-cylinder, 4¾ x 6 in. LeRoi gas engine. This unit, equipped with its own electric starter, generator and voltage regulator, drives by V-belts through a clutch, an ammonia compressor. This engine-compressor set operates independently of the main power plant.

After ten years of experience with this plant, the Dallas Gas Company has ample evidence on its books of the financial rewards of natural gas engine operation. With its plant enlarged and renovated, the company now looks forward to another decade of successful operation. The engines in this plant are Bruce Macbeth; the generators Westinghouse; the waste heat boiler, Sims; lube oil, Gulf Harmony C; cooling water pumps, Fairbanks Morse; magnetos, K.W.; the starting air compressors, Worthington and Ingersoll-Rand; the switchboard and voltage regulators, Westinghouse. The air conditioning unit consists of a LeRoi engine with Leece-Neville starting system, driving a York compressor through a Twin Disc clutch.



For air conditioning the first floor and offices, there is a LeRoi gas engine driving a York compressor through a Twin Disc clutch.

Upper view shows the new General Motors two-unit, 4000 hp. Diesel locomotive recently put in service by the C.M.&St.P. Ry. on the famous Hiawatha between Chicago and the Twin Cities. Right: One of the four 1000 hp. General Motors Diesels in the new Milwaukee locomotive.

THE HIAWATHAS GO DIESEL

By CHAS. F. A. MANN

AMERICA'S most heavily travelled, high-speed, streamlined trains, the colorful Milwaukee Railroad's twin Hiawatha trains, operating on a double daily round-trip schedule between Chicago and St. Paul, Minn., have gone Diesel, after nearly seven years' operation with, first, a pair of high-wheel Atlantic type (modified) oil-fired steam locomotives, when the seven-nine car service began on a one round trip basis in 1935; then, as the trains lengthened, a pair of heavy coal-fired locomotives with six drivewheels each seven feet in diameter.

The Hiawatha trains now bring the Milwaukee about $5,000,000 per year revenue. This fall, determined to test out once and for all the merits of coal and oil-fired steam, and TWO types of Diesel, the Company purchased a two-unit. 4,000 hp. General Motors Diesel locomotive to run Southbound on the morning Hiawatha, a somewhat slower schedule than the afternoon Hiawatha.

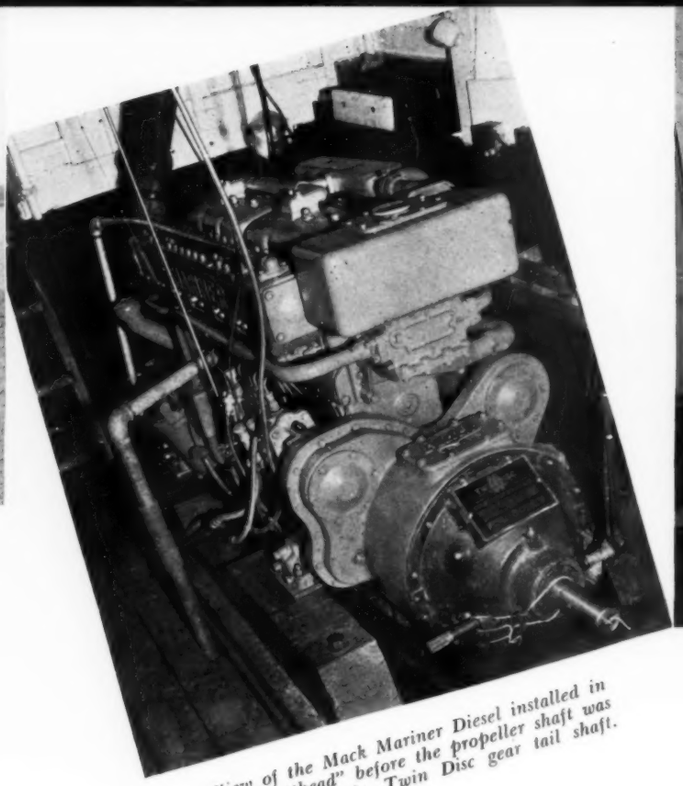
In November, an identical 4,000 hp. two-unit Alco-G.E. Diesel locomotive was purchased to haul the afternoon Hiawatha, northbound to the Twin Cities on the fast, heavy schedule that makes the trip of 410 miles in 375 minutes. Reversing the procedure at night, the ALCO locomotive will haul a fast Chicago-bound standard sleeper train out from the Twin Cities, while the General Motors Diesel locomotive will haul the fast mail from Chicago to the Twin Cities. Thus, each of the Diesels will make a round trip of 820 miles daily, while the steam locomotives will work opposite, probably only 400 miles daily part time. The Alco-G.E. locomotive is powered with two six-cylinder, supercharged four-cycle McIntosh & Seymour Diesels, with G.E. electric transmission and regulation flash type heating boiler, and the General Motors locomotive has the regular twelve cylinder V-type two-cycle Diesels, with full electric transmission. Both the two-cycle and four-cycle power plants develop a rated horsepower of 1,000 each, and both units are approximately 73 ft. overall length, or about 150 ft. over couplers for the two-unit, 4,000 hp. double-ended locomotive. Cabs are located at each end, avoiding the necessity for turning the locomotives, and fuel capacity is sufficient for almost a full round trip, though fuel and water is taken at both ends of the run.

Woodward Governors and Buchi superchargers are fitted on the Alco locomotive, and both locomotives ride on six-wheel, roller bearing trucks, sprung and stabilized for 100-120 miles operating speed necessary on these fast runs with seven intermediate stops.

This is the first railroad steam-Diesel experiment of its kind ever attempted in the world, and will be watched with keen interest by rail and Diesel engineers.

The Alco-GE, two unit, 4000 hp. Diesel-electric locomotive on the Milwaukee's crack train, Hiawatha.

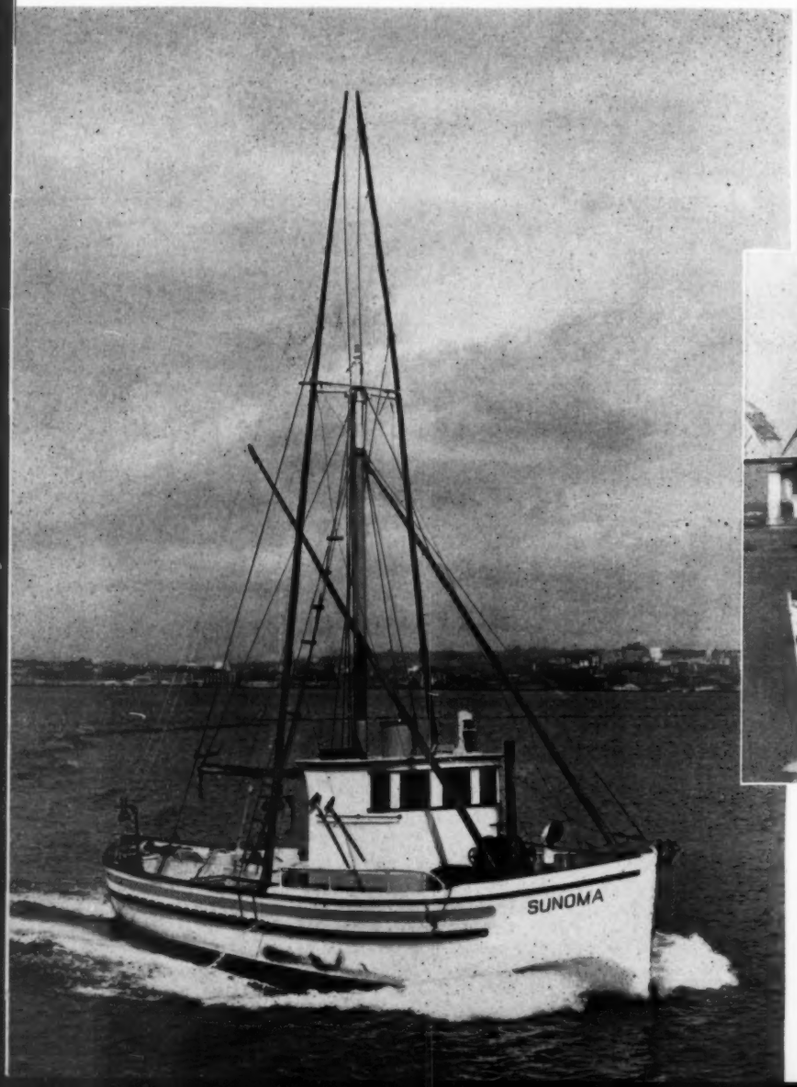
The "Butthead" is a 42 foot towboat and is equipped with a Mack Mariner Diesel with a 3 to 1 reduction gear. Owned and operated by the Parkhill Dredging Co., Jacksonville, Fla.



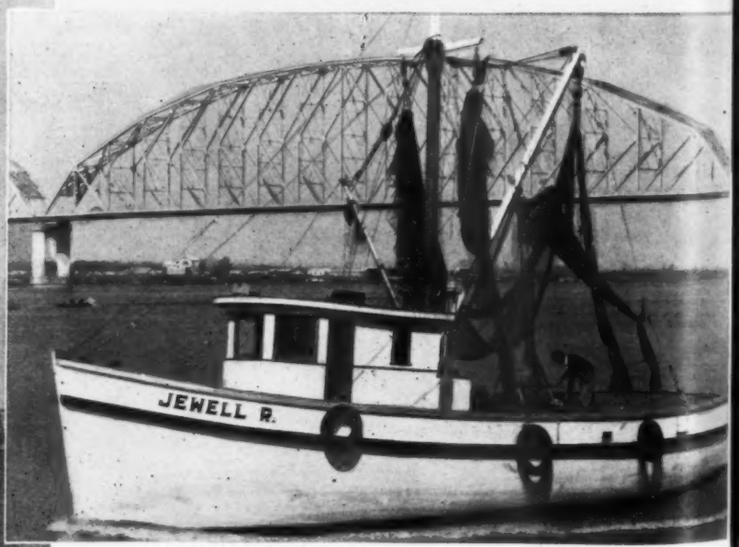
View of the Mack Mariner Diesel installed in the "Butthead" before the propeller shaft was connected to the Twin Disc gear tail shaft.

Engine compact this sma

"Sunoma" hails from Seattle, Washington, being used as a commercial fisherman, (Salmon and Albacore trawler). Having a length of 46 feet, width of 12 feet 6 inches, and a draft of 5 feet 6 inches, she is equipped with a Mack Mariner Diesel engine and a 3 to 1 reduction gear.

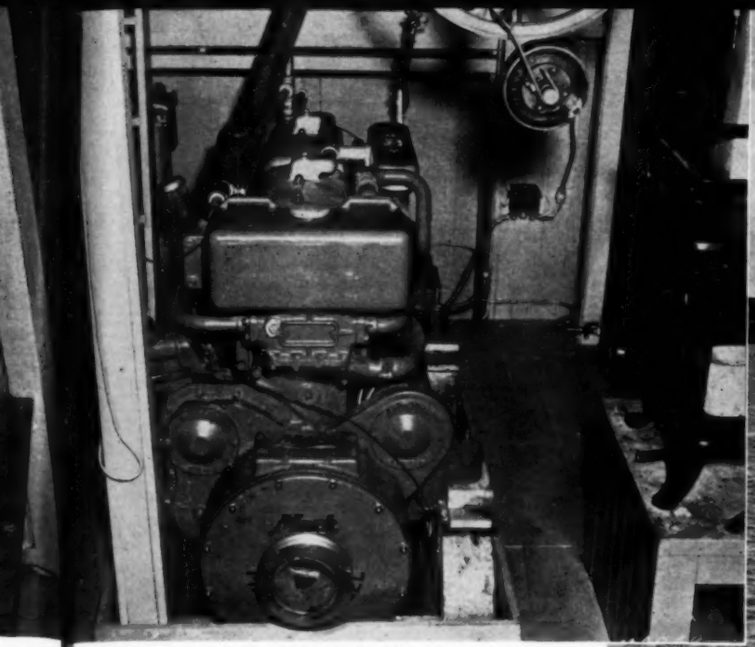


MORE FISHERS AND MA



"Jewell R", owned by Mr. "Slim" Richmond of Morgan City, Louisiana, is a 52 foot shrimper with a 16 foot beam and a 5 foot draft and is powered by a Mack Mariner 605-W with a 3 to 1 twin reduction gear.

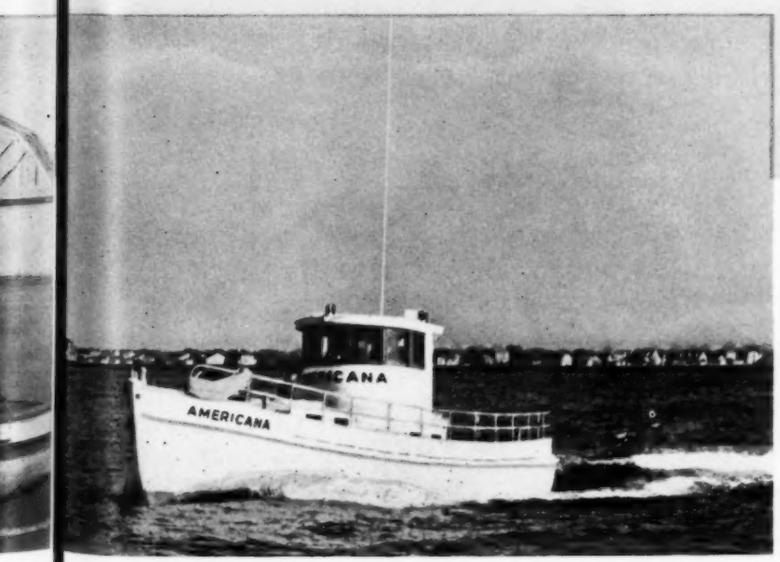
"Ame tion Robe and



Engine room of the "Marylyn". Note how the compact Diesel leaves ample working space in this small boat, seen right.

Hailing from Seattle, Washington, this salmon troller "Marylyn" was built in 1939 and her Mack Mariner Diesel was installed in February, 1940. Captain Charles Hansen, her owner, pursues his finny quarry up the Pacific Coast as far as Alaska, getting a consistent nine miles from her with a 2 to 1 reduction gear. The engine room view shows the compact clean cut installation.

NDSMALL WORK BOATS DIESELIZED



"Americana" is equipped with a Mack Diesel and a 2 to 1 reduction gear. The "Americana" is owned and operated by Mr. Robert Davis out of Key West, Florida. It is used for ferrying and as a party fishing boat.

The tug "Manhattan" is owned and operated by the Chemical Const. Co. of 30 Rockefeller Plaza, New York City. It is a 50 foot shallow draft tunnel stern river towboat now operating in British Guiana, S. A., hauling bauxite ore barges. It is equipped with twin Mack Mariner 605-W engines and 3 to 1 reduction gears.

GRAFTON, NORTH DAKOTA

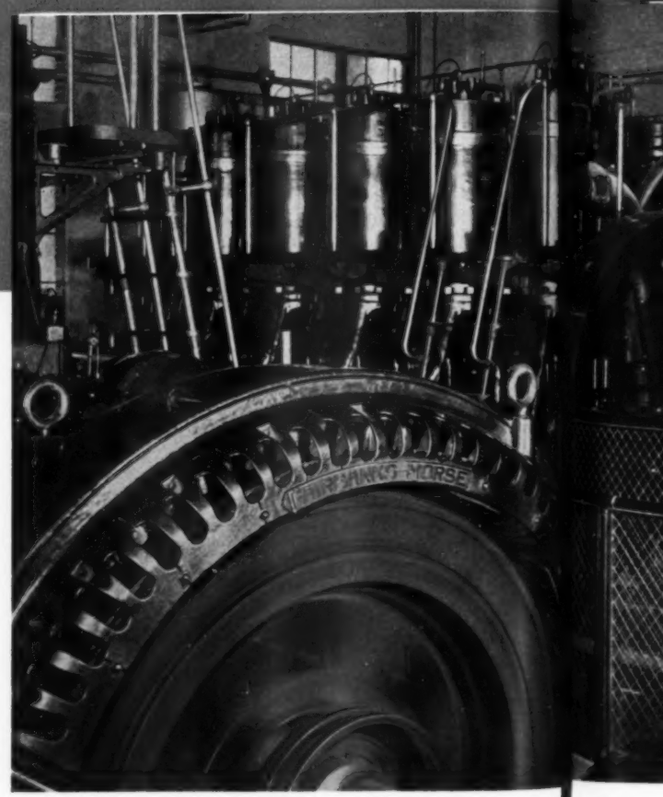
By GEORGE D. CROSSLEY

IN the decade ending February 15, 1940, the Grafton Municipal Light and Water plant added a successful chapter to the story of municipal ownership of utilities in the state of North Dakota. The economy of Diesel engines has played no small part in this story of uninterrupted progress. At the end of ten years, a perusal of annual audits shows the plant has earned profits of $304,345.29 exclusive of losses absorbed in the conduct of the water department, due to lack of sufficient patrons.

Grafton, a city of slightly less than 3,500 persons, was the first city in North Dakota to own its light and power plant, the original plant, established in 1889, having been acquired by the city in 1895. This was a small, one-unit steam plant and it served the city until the replacement plant was opened in the same building, a block north of the present plant. For a period of nine months, from November, 1926, to August, 1927, the plant was operated by the Otter Tail Power Company. The city had agreed to sell the plant to the company for $125,000 but citizens opposed to the transaction obtained an injunction preventing the sale. The company operated the plant during the litigation, but relinquished control when a court ruling voided the transfer.

Agitation for the present plant began in January, 1929, when the city council called a special meeting to study facts, figures and estimates on a project involving Diesel engines and modern generators. At a meeting March 3, 1929, the council decided to ask voters of the city to approve a bond issue of $40,000 to rebuild the plant and construct a new municipal building. In 1921, a $40,000 bond issue had been approved and $17,000 had been issued to finance improvements in the plant, leaving $23,000.

At an election August 22, 1929, the proposition carried by a majority of 159 votes. In the meantime, the Otter Tail Power Company sought to close a deal for purchase of the property, but was unsuccessful. Contracts for the new plant were awarded Sept. 24, 1929, to B. D. Johnson, a Grafton contractor, for the building and to Fairbanks, Morse & Company for the machinery. Johnson began the work of excavating the last part of October, the last bricks were laid in the middle of November, and two Diesel engines and generators arrived early in December. The new plant began operations February 15, 1930. The following month the council reduced the electric rates from 13 to 8½ cents. The first audit of the plant was made March 31, 1931, covering the period from May 1, 1929, to the auditing date. The auditing firm listed the cost of the entire plant at $149,816.80. The total gross operating cost for this period was $50,493.29. The net income for the period was $3,202.73. The audit for the period from December 31, 1932, to December 31, 1933. The figures on profit have since increased materially.



General engine room view showing the three Fairbanks-Morse Diesel generating units.

The first large unit installed by Fairbanks, Morse & Company was a 360 hp. Diesel. Two years later, a 630 hp. Diesel was installed and, in 1937, an 875 hp. Diesel unit was added to the equipment, an old 180 hp. unit being traded in. The 630 hp. unit is used for daytime service. At night, the service is divided between that unit and the large 875 hp. engine. The 360 hp. unit is used from 12 M to 7:30 a.m.

Payment of the last note on the indebtedness for the plant was celebrated by the plant personnel and the city Oct. 20, 1934. It was pointed out then that a municipally-owned plant can be a highly profitable enterprise.

Top view shows Grafton's new municipal building which houses the power and water plants, offices, garage, police and fire stations, and American Legion clubrooms. Below: The switchboard, equipment for which is all G.E.

Grafton's light and water department is governed by four aldermen who comprise the public utilities commission. They are John Olson, J. C. Overbye, George Harris and G. W. Foogman. L. R. Roney is plant superintendent.

The period covered by the audits of the new plant date from May 1, 1930, to Dec. 31, 1939, and present a most interesting picture of managerial efficiency and increased earnings. The total net profit during this period was $160,984.66, averaging $17,887.18 per year. The total net profit does not include the refund of 10 per cent of gross profits for the last three years, totaling $20,013.62, which is required by state law in the case of municipal plants. The addition of this refund brings the total earnings to $180,998.28.

Depreciation charged from gross profits during the 10 years totals $107,457.32. Current donated over the same period totals $15,789.69. Thus the value of donated current, depreciation and the refund to the city, plus the net profit for the period, brings the total of profits to $304.345.29, a figure of which the city of Grafton is justly proud.

The three Diesels are Fairbanks-Morse, a 5-cylinder, 16″ x 20″, and two 6-cylinder, 14″ x 17″ units, all direct connected to F-M generators operating at 300 rpm. Engine accessory equipment includes American intake air filters, a Phillips and a Marley cooling towers, F-M water pumps, Hilco lube oil reclaimer, Nugent fuel oil filters, two F-M and one Quincy air compressors, Texaco lube oil.

Ralph Myers Construction Company—Home office, Salem, Indiana—on the Hazelwood Federal Housing Project, just outside of Pittsburgh, is using six of these bottom dump Euclids, powered with 150 hp. Cummins Diesels, carrying 9 yards of loose material. A load is dumped by these trucks every 1½ minutes, operating 24 hours a day. The job involves a total of 850,000 yards, cutting down a couple of mountain sides and filling the valley, making a site to provide lodging for Defense workers in the steel mills.

Mashuda-Laub and Collins are shifting the hills to the valleys, leveling a huge airport in the mountains near Johnstown, Pa. This is a 1,000,000 yard W.P.A. job sponsored by the City County CAA. Equipment in use includes four of these 15 yard Super C Tournapull scrapers powered with 150 hp. Cummins Diesels. On the present one mile round trip haul, these speedy dirt movers carry seventy 15-yard loads in an eleven hour shift. The units have worked here 23 hours per day, 6 days per week since June.

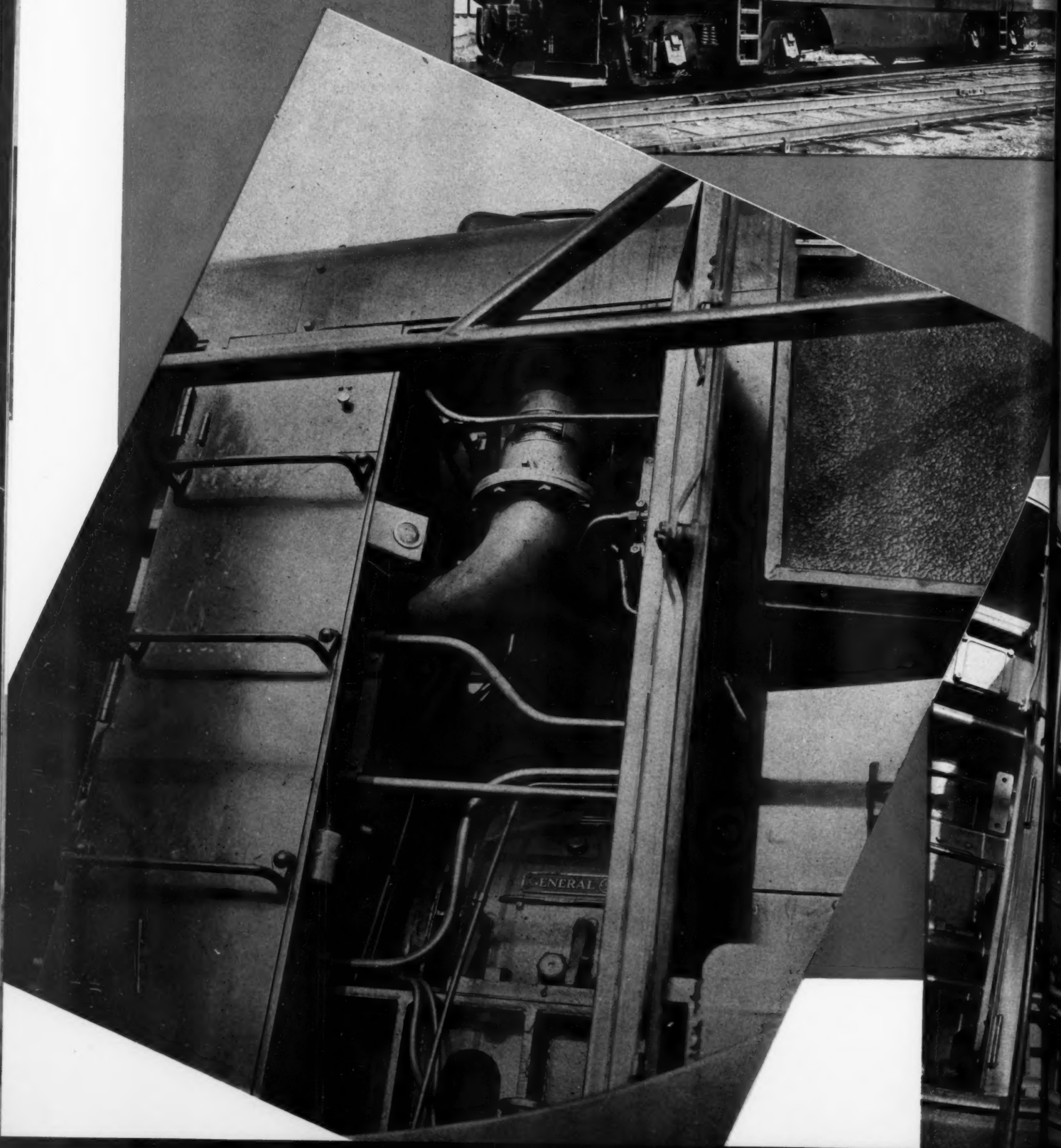
DIESELS IN HEAVY GOING

By DWIGHT ROBISON

George Vang, Inc., Pratt Bldg., Pittsburgh, is now working as a sub-contractor of the Great Lakes Dredging and Dock Company, who have the contract for the U. S. Engineer Loyalhanna Dam. The dam will control the Loyalhanna River, a tributary of the Allegheny River, for flood control protection of Pittsburgh. Work started September 26, 1939, and the job involves approximately 60,000 yards of rock; 50,000 yards of common excavation; 100,000 yards of concrete; 40,000 yards of earth-fill. All excavation, fills, and drilling has been sublet to Vang. Of his Cummins Diesel engined Sterling truck, Mr. Vang said, "This truck will go right up a mountain. I'd take the Diesel every time . . . no comparison with gas. Gas trucks hauling the same load use 30 gallons of gas per 8 hours. This truck uses 10 to 12 gallons in the same time." This truck is hauling an average load of 8 to 9 yards, weighing 1½ tons per yard, working 8 hours six days per week. Lube oil is changed every 40 to 50 hours.

One of the two new Diesel-electric locomotives for Monongahela Connecting Railroad which went into service in October. The locomotives are double-ended, with a 400 hp. turbo-charged Cooper-Bessemer engine on each end.

A close-up through one of the doors showing the lower portion of the Elliott-Buchi turbo-charger mounted immediately above the G.E. generator.



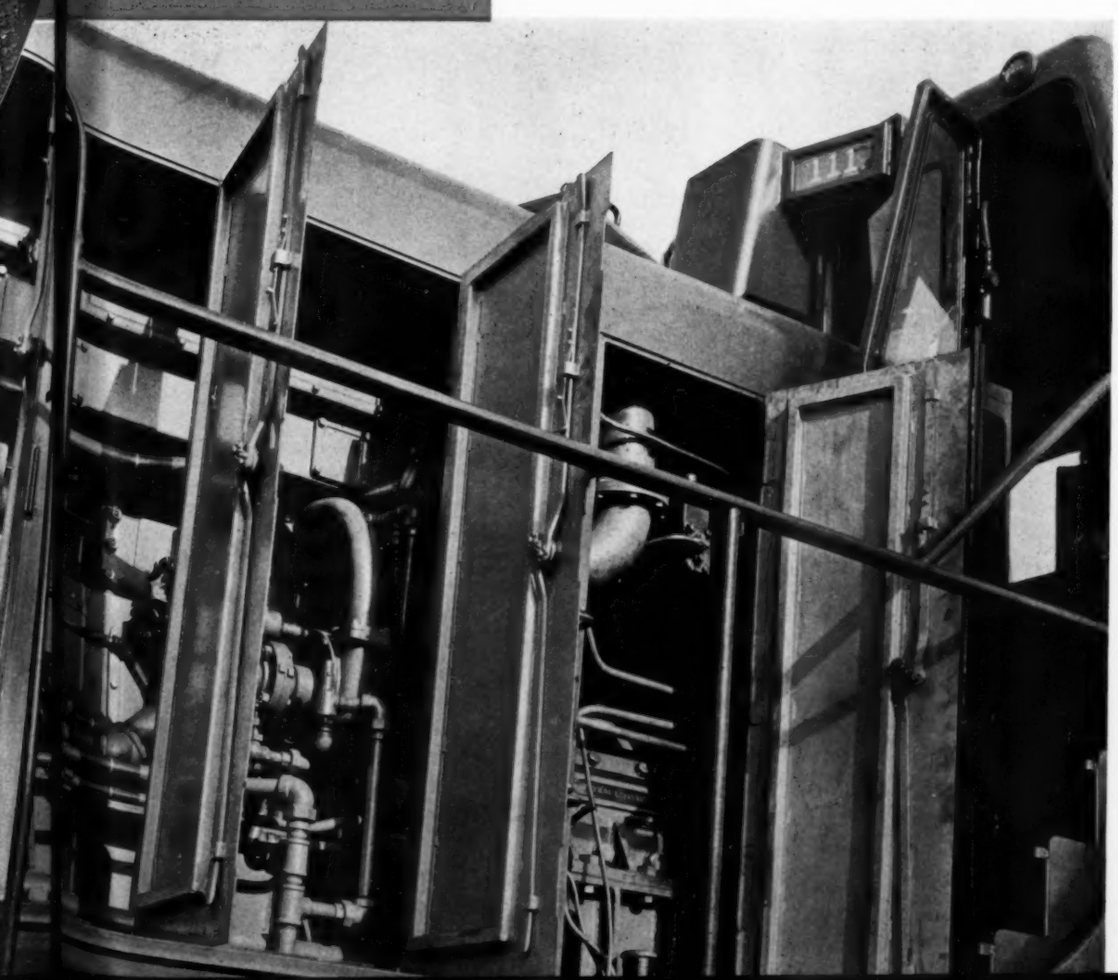
TURBO-CHARGERS ON DIESEL-ELECTRIC LOCOMOTIVES

By GEORGE D. CROSSLEY

FOUR Elliott-Buchi turbo-chargers have recently gone into service on two 800 hp. Diesel-electric switching locomotives on the Monongahela Connecting Railroad in Pittsburgh. One of these two identical locomotives is illustrated on the opposite page. Diesel switching locomotives have become very popular in recent years. They have advantages of great flexibility, high tractive effort at low speeds, excellent visibility for the operator, no standby cost, low maintenance, and greater hours of availability as compared with steam locomotives. Their shorter rigid wheel base is an advantage on the Monongahela Connecting Railroad which has many short curves.

The Monongahela Connecting Railroad is a switching road and connects with the three trunk lines serving Pittsburgh, namely: The Pennsylvania Railroad, The Baltimore & Ohio Railroad, and The Pittsburgh & Lake Erie Railroad of the New York Central System. It has seven miles of road, thirty-eight miles of track. thirty-two locomotives and 735 cars. For the year of 1940, the railroad handled 14,500,000 tons of freight. It performs switching service between the mills of the Jones & Laughlin Steel Corporation of Pittsburgh, Pa. On the Monongahela Connecting Railroad. Diesels have replaced some steam locomotives. There are at present twenty-two steam locomotives and ten Diesels. The last four Diesel locomotives have been supercharged. The first two supercharged Diesel jobs used Buchi turbo-chargers built in Switzerland. When the two latest Diesels were up for consideration, it was a pleasant surprise for all concerned to learn that Elliott-Buchi turbo-chargers are now being built in this country. So Elliott-Buchi turbo-chargers were incorporated in the design of the 400 hp., six cylinder Cooper-Bessemer engines, two of which are installed in each locomotive. From experience with the first two turbo-charged locomotives, the Monongahela Connecting Railroad knows that turbo-chargers give more power in smaller space; that they allow higher locomotive speeds and more power per pound of locomotive.

The Buchi system of supercharging utilizes energy in the exhaust gases which is otherwise wasted, using an exhaust gas turbine to drive a centrifugal blower which supplies air under pressure to the engine cylinders. In fact, the turbo-charger serves a dual purpose, that of assisting in the scavenging cycle, as well as to forcing more air into the cylinders just prior to the compression stroke, thus permitting the injection of a larger quantity of fuel with resultant increase in power output.



The opened doors show how compactly the Cooper-Bessemer engine with Elliott-Buchi turbo-charger is installed in either end of the locomotive.

Summarizing the Annual Inspection and Overhauling of Your Diesel Units

By R. L. GREGORY*

THE last three issues of DIESEL PROGRESS have carried articles in this section dealing with the various phases of the annual inspection and overhaul of Diesel units. These articles have dealt with generalities showing examples of this work as applied to a typical Diesel. Due to various makes of Diesels, constant improvements and changes in design, and operating characteristics, the inspection routine as previously discussed will not apply to all units. The outline, however, with variations can be applied to most makes of Diesels in most plants.

The most vital point of all is the record which can be compiled from these inspections. This information is invaluable to the operating and supervising personnel, as it gives the complete picture of the status quo of the unit upon completion of the inspection and overhauling. Thus, it forms a basis for the next inspection.

There is another phase where this information is most valuable. Under our present war effort, the government, through the Federal Power Commission, is vitally interested in the power situation of the country. Consequently, they are interested in your plant and mine, and such information, properly compiled, is of greatest value to them in ascertaining just what the power situation at present is, and the condition of the equipment upon which we depend to turn out the power for war material projects. The man on the outside does not know and, therefore, must depend upon our cooperation to arrive at these essential statistics.

The points covered in these previous discussions did not include all the details of inspection, but they did cover those parts of the equipment which are most likely to give trouble if not attended to. The minor details of repairs to auxiliary equipment, while important, can be looked after during the preventative maintenance periods. It is a mighty good idea to supplement the annual inspection report with a report on the maintenance done during shutdown periods throughout the year. When this is done, the scope of the year's work lies before you. For example, we keep a record of oil changes, amount of oil filtered throughout the year, the hours this oil is in service, and the various analyses of the samples sent in to the vendor for checking up. We also have a record of the auxiliary equipment maintenance; when the pumps are overhauled, packed; the heat exchangers cleaned and checked; the strainers cleaned; in fact, every step of maintenance is recorded. Periodically we put hydrostatic tests on our cooling coils, we remove the bleeder valves from the coolers to ascertain the condition of the valves and seats. We clean the drains and check the piping.

The most vital parts of the unit, such as the fuel pumps, fuel valves, atomizing equipment, compressor valves, etc., are checked regularly between the annual inspections, as discussed in previous articles. The reason for this is that these parts are subjected to a lot greater wear and tear due to varying conditions of fuel, temperatures, etc., and because such parts are more intricate and of more delicate construction. Yet they form the vital parts of the unit, and keeping them in proper condition is necessary to the proper functioning of the engine.

I do not mean to insinuate that the annual inspection and overhauling is a cure-all for the evils which may arise in the operation of your equipment. It is a means, nevertheless, toward assuring you that the equipment under your charge or which you are operating is in as good mechanical condition as you personnally are capable of keeping it. The best of our equipment will sometime or another break down, due to conditions beyond our control, but no more patriotic move can be made on the part of each and every one of us than to see that our equipment is in as nearly perfect mechanical operating condition as we, as engineers, can keep it. We are not responsible for errors in design or construction, but we are responsible for letting equipment, through neglect, become a menace to uninterrupted service.

When we find these errors or, by ingenuity and study, find some new way of making our units function better, or discover and try some original idea which results in an improvement of our operating conditions, we should be morally bound, especially at this time, to pass that idea on to the maunfacturer for further investigation. Perhaps you have had the experience of finding that even the most inexperienced engineer has at some time or other stumbled onto an idea which when put into effect has helped some condition which has been causing you difficulty. We are not infallible, and the old adage that two heads are better than one applies at all times.

In some of the future articles appearing in this section, the writer will discuss some of these features which have been found and incorporated on various units. Little things which, while they may seem to be of little value have, when tried out, given results far beyond expectations. This section would be interested in hearing from Diesel Engineers who have made some such discoveries on their units and will gladly discuss them for the interest that we mutually have in the Diesel industry.

So, let's keep our plants and individual units in the best possible shape, cooperate with the manufacturers who we all know are beset with many difficulties at this time, and put every ounce of effort into giving our best for war effort, life, liberty, and the pursuit of happiness, which is our heritage.

* *Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.*

TWO-STEP STARTER

Auto-Lite Two-Step Diesel Starting Motors are available in both manual (foot-pedal operated) and automatic (push button operated) types. Auto-Lite Shunt Generators, 12, 24 or 32 volt; 100 to 2500 watt capacity. Auto-Lite Heavy-Duty Voltage and Current Regulator—3 units; voltage regulator; current regulator, and cut-out relay in one water- and dust-proof assembly. Maintains voltage to plus or minus 2%

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Auto-Lite Starting and Generating Systems for Diesels are designed and built by the world's largest independent manufacturer of automotive electrical equipment. For prices and complete details, write to

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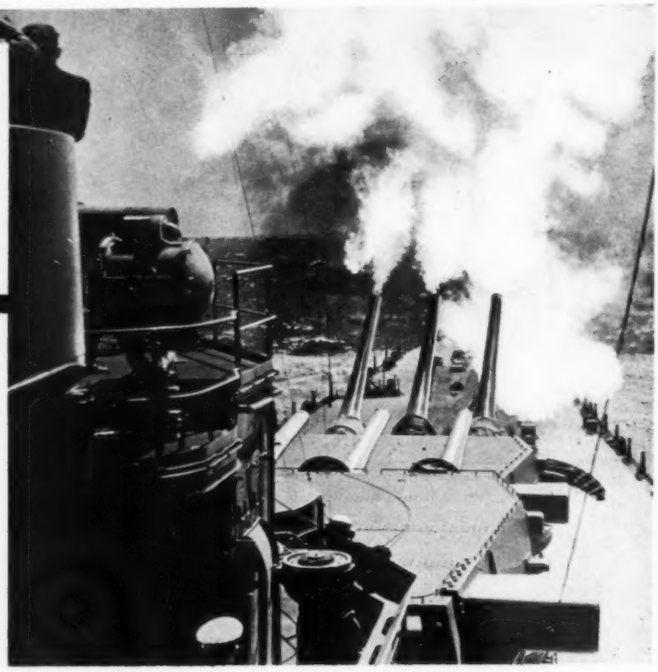
WAR PRODUCTION tolerates no slow-downs. Don't allow inadequate lubrication to reduce engine efficiency. For *DIESEL ENGINES* there are . . .



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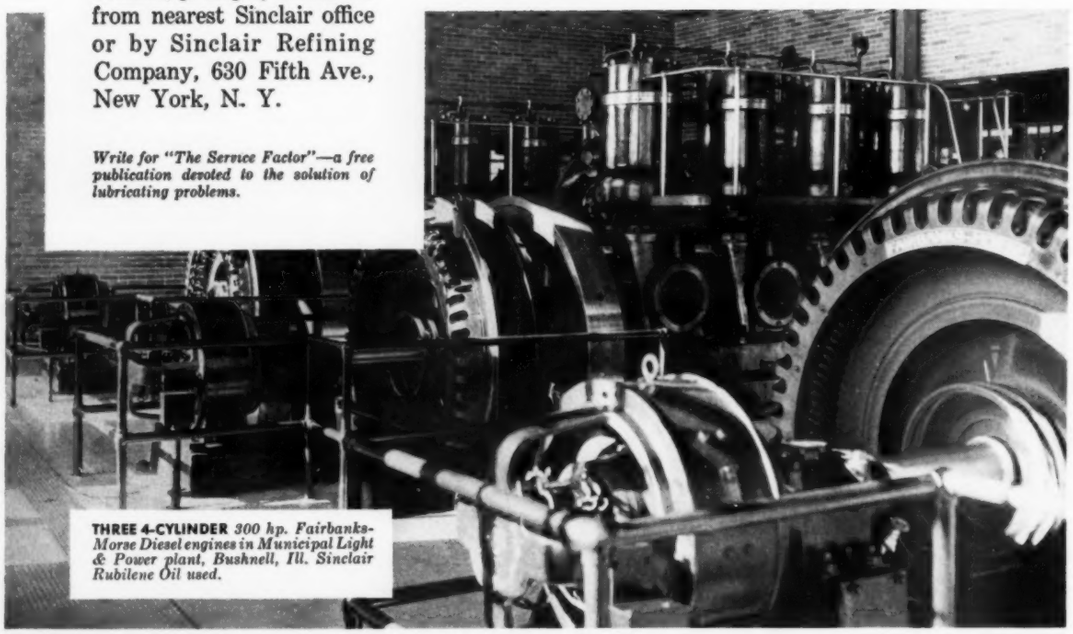
Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



THREE 4-CYLINDER *300 hp. Fairbanks-Morse Diesel engines in Municipal Light & Power plant, Bushnell, Ill. Sinclair Rubilene Oil used.*

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Enterprise Lands Several Orders

RECENT SALES reported by the Enterprise Engine and Foundry Company, San Francisco, include an 875 hp. DMQ 36 supercharged Enterprise Diesel ordered by the U. S. Quartermaster Department for a new 174′ passenger and freight vessel being designed by N. C. Nickum of Seattle for Alaskan Service.

THE Maritime Commission has ordered eleven sets of main propulsion machinery for its V4 sea-going tugs, each set consisting of two DMQ 36 Enterprise 1,200 hp. supercharged Diesels driving a single shaft through Westinghouse electric couplings and Universal reduction gears.

THE Foss Launch and Tug Boat Company, Tacoma, has ordered a 750 hp. Enterprise DMQ 38 exhaust gas supercharged engine for its tug *Tyee* and a 1,100 hp. Enterprise DMQ 36 exhaust gas supercharged engine for the tug *Cudahy*. These are reported to be the first exhaust gas supercharged engines to be used in ocean-going tugs.

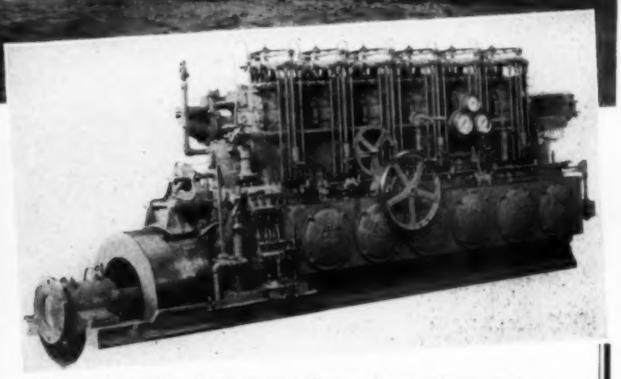
THE Enterprise Engine Company reports the recent sale of a 240 hp. Diesel to the San Francisco Towing Company to be used in the tug *Marion*. This is the third Enterprise engine to be purchased by this company in the last twelve months.

George Codrington a Vice President

THE Board of Directors of General Motors Corporation, at its meeting on January 5, elected George W. Codrington, General Manager of the Cleveland Diesel Engine Division

George W. Codrington,

of the Corporation, as a Vice President of the Corporation. This is a well merited promotion and our sincere congratulations are extended to Mr. Codrington.



The modern West Coast Tuna Clipper, shown above, carries this Atlas, 220 hp. Diesel for propulsion and an "Alnor" pyrometer for protection.

Protection of Main Diesel is Essential On Voyages of Tuna Clipper

The fine new Tuna Clipper, "North America," was designed by Adolph Larson, naval architect, for Captain A. Ghio and a group of San Diego fishermen, and was built by Al Larson Boat Works, San Pedro, California. She is 72′ long, 20′-6″ beam, 9′-6″ deep with a capacity of 64 tons of fish. Her main propulsion engine, an Atlas, six-cylinder 220 hp. Diesel must function smoothly and efficiently on the voyages to fishing grounds and quick dashes back to port. Engine performance is indicated at all times by a dependable, precise Alnor exhaust pyrometer.

●

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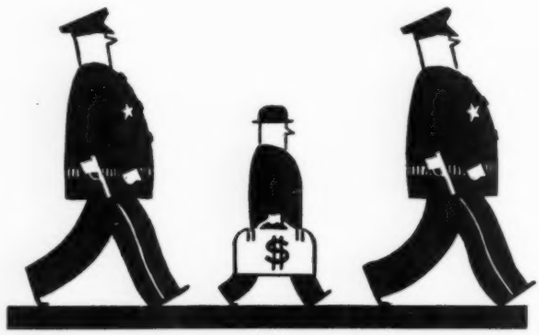

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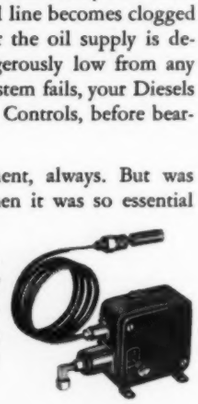
Protect your investment . . . don't take a *needless* risk. Penn Safety Controls on your Diesels will automatically shut them off—*before damage can be done.* If an oil line becomes clogged or broken, or the oil pump fails, or the oil supply is depleted, or if oil pressure drops dangerously low from any other cause, or if the water cooling system fails, your Diesels are shut down automatically, by Penn Controls, before bearings can become overheated.

Diesel engines are valuable equipment, always. But was there ever a time as the present when it was so essential to—*keep 'em running!*

Do it with the help of Penn Safety Controls! The cost? Less than that of a single one of the repair jobs they can and may prevent. Get complete information . . . mail the coupon *today!*



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Gray Holds Diesel Service School

EAST met West in Detroit at Gray's December Service School, last of a series, when ten men attended from Gray distributors all the way from Seattle to Jonesport, Maine.

These sessions were arranged to take the place of the regular "get together" during the New York Boat Show, which was cancelled for this year and a total of 22 distributors' men have been at the factory during the winter.

Coordination was supervised by Mr. Fred Crebbin of the Gray Sales Department; Instruction by Mr. Robert Gardiner and Mr. Ferd Weyer of the Gray Engineering Dept., and Mr. Robert Lockridge of the Diesel Test Room. The school as arranged by Gray is not a mere "tour of the factory" such as that to which visitors are usually treated, but a notebook and overall job from early morning to late at night. Field problems are discussed and the men actually do with their own hands the various operations of disassembly, repair, reassembly and test.

Shown in the above illustration, left to right, are: S. O. Jules, Seattle; Louis Grouch (kneeling) New York; C. R. Evans, Seattle; W. B. Tuck, Philadelphia; J. H. Chivall, Boston; John F. Schram, Philadelphia; George O. Beal, Jonesport; Oliver Loptson, Toronto; Robert Gardiner, Detroit; John A. McCleary, Toronto; Frank A. Winegardner, Philadelphia.

Closing the week, a formal banquet was held at the Whittier Hotel, attended by Mr. Glen Shoemaker, Research Engineer and Mr. Max Schachner, General Sales Manager of Detroit Diesel Engine Division from the General Motors Corporation. On the following evening, the guests themselves were hosts to the factory men at a buffet supper, treated to prime Maine lobsters shipped by iced express from Mr. George O. Beal's own wharf in Jonesport.

Two More Bushey Tugs

. . . . *Continued from page 30* . . . .

type. A Milwaukee oil refiner, as supplied by Holcomb Engineering Co., is also utilized on the *Hartford* and a Youngstown-Miller purifier on the *Stamford*. Lube oil for the Diesels is Socony-Vacuum DTE extra heavy.

The freshwater requirements of the *Stamford* and *Hartford* are taken care of by a 450 gpm. Fairbanks-Morse automatic fresh water system, complete with 42 gallon galvanized tank. The sanitary system is comprised of a similar unit, except that it is fitted for salt water service with a special 42 gallon copper tank. The storage battery is an Edison 56 cell unit.

The electrical control panel, in the upper engine room, was built by Smith-Meeker Engineering Company, in accordance with the specifications of Ira S. Bushey & Sons and carries the Weston tachometer, Brown pyrometer and the Seth-Thomas clock.

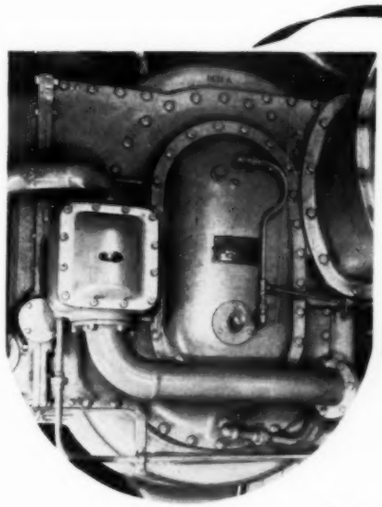
The pilot house, finished in gray marble stain, allows for a freedom of movement, yet with all the necessary instruments at hand, including a Bludworth signal arrow direction finder, a Weston Tachometer, pedestal, brass binnacles, and spiral compass by Negus, the Johns-Manville sound proofing and the Western Electric ship-to-shore telephone.

The *Hartford* and *Stamford* are now in service, and with their sister ships *Providence* and *Flushing* give Red Star a quartet of the very latest in marine Diesel tugs, all of which are now busily engaged in New York harbor service.

West Coast Diesel Marine News

WRANGELL, Alaska, to Telegraph Creek, British Columbia, via the Stikine River, the swiftest navigable stream in the Northwest area, offers the supreme challenge to riverboat power. After twenty-five years of operation over this 163 mile tortuous route, the Barrington Transportation Company decided to install Superior Diesels in their latest addition to their fleet of passenger and freight boats, the *Hazel B No. 1.* The vessel, 64′ by 23′ with a draft of 24″ loaded and 12″ light, of 34 tons net and pushing a 50 ton barge, is powered with twin MRD6 170 hp. engines, with Twin Disc 2 to 1 reduction gears, efficiently negotiates the hazardous course with an elevation of better than 560 feet between terminals. Making the up-trip in three days, she is the fastest craft on the river. She is the second of the Barrington Fleet to be powered with Superior Diesels, an undisputable testimony of Superior's dependability.

INSTALLATIONS of Superior Diesels include a 260 hp. engine in the rebuilt *Simon Foss,* of the Foss Launch and Tug Co., Seattle, Washington; a 90 hp., with Twin Disc gears, in the



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Port Adams Packing Co.'s 57 ft. cannery tender *Payco,* also of Seattle; five 230 hp., with Twin Disc gears, to Wilbur Smith, "flying mayor" of Rainier, Oregon, for the tugs *Jupiter* and *Ajax* (2 each), and the *Boomer* (single).

NEARING completion at the San Diego Marine Construction Co., San Diego, for the Star and Crescent Boat Co., is the 88 ft. towboat *San Miguel* powered with a 6 cylinder 465 hp. Washington Diesel turning a Lambie wheel. Auxiliary Diesel is an Atlas Imperial 3 cylinder, 45 hp., with 30 kw. generator. Constructed for oil barge towing service, the barge is fabricated by Dravo Corp., Pittsburgh, and will use two Atlas Imperial Diesels for pump service.

CATERPILLAR Diesel installations continue north and south on the Pacific Coast: twin marine Diesels, 60 hp., in the 56 ft. *Porpoise;* twin 100 hp. in the *Sea Otter;* and twin 70 hp., in the *Walrus,* all cannery power scows built by Alaska Packers Association, Alameda, California, and the Maritime Shipyards, Seattle, Washington, for Alaska Packers' canneries, Bristol Bay, Alaska. In the south at Los Angeles harbor, Skipper Frank Campbell installed a 25 hp. Caterpillar Diesel in his 35 ft. fish boat *Huston,* and found that his total cost of operation had been reduced to the extreme low of .10 per hour.

THE 65 ft. Tidewater Transportation Co. towboat *Viking,* under construction at their plant in Attalia, Washington, will be powered with a 800 hp., Enterprise Diesel, to be later fitted with a supercharger to add 500 hp. She will operate below The Dalles on the Columbia River in fuel oil barge service.

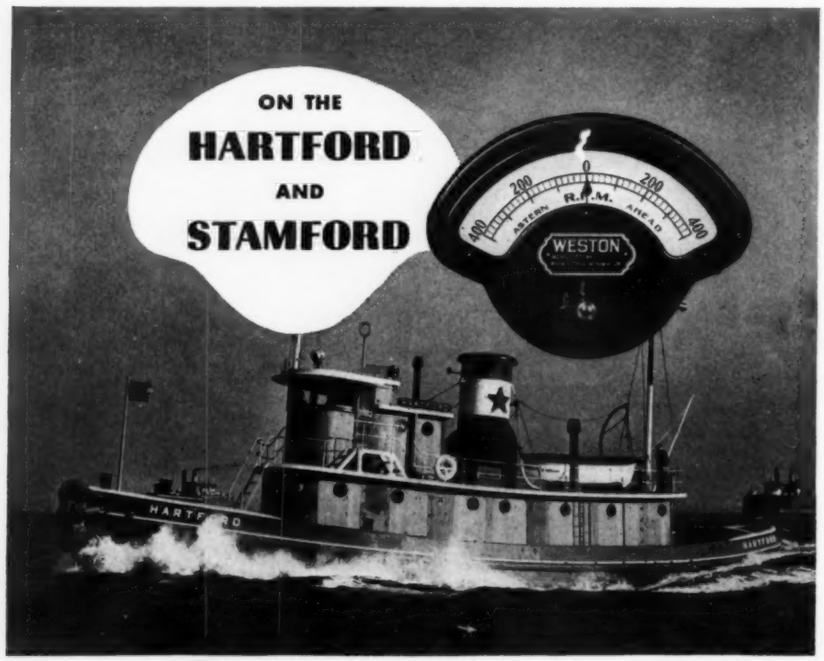
ATLAS Imperial Diesels installed in San Francisco Bay workboat fleet include a 300 hp. in the towboat *Crowley No. 23* of the Red Stack fleet; a 160 hp., in The River Lines' tug *Lorna;* and a 220 hp., in Joe Aliotti's purse seiner *Jackie Boy.*

POWER scows used in the Alaska salmon fishing industry began to receive popular attention by the cannery companies in 1940, and since then a large number have been built, all powered with Diesel engines. An outstanding example of these modern net tenders is the Kodiak Fisheries' 84 ft. "shovel nose" *Duchess* powered with two 135 hp. Murphy Diesels with 2 to 1 reduction gears. Power takeoffs are provided for auxiliary service.

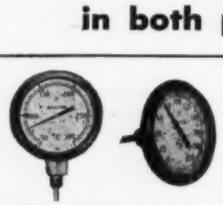
REPORTS from the British Columbia, Canada, shipyards of Diesel engine installations include a 180 hp., Fairbanks-Morse in the seiner *Western Challenger,* a 73-footer for Capt. Charles Clarke; a 200 hp. Washington Diesel in the 77 ft. *Cape Canso* for the Canadian Fishing Co.; a 110 hp. Gray Diesel in the 41 ft. troller for Malaspina Fisheries; a 75 hp. Buda in the 54 ft. seiner for Pete Anderson; and a 75 hp. Atlas Imperial in the 56 ft. seiner for Capt. M. Tarkennan.

TWIN Cooper-Bessemer EN6 Diesels power the new U. S. Coast and Geodetic Survey vessel *Patton,* turning 44" x 29" Coolidge wheels. Engines rate 150 hp. at 500 rpm., and are equipped with Ross heat exchangers. The 88 ft. vessel is fitted with Exide batteries, Fairbanks-Morse fresh water pressure unit, and John Reiner 28 hp. Diesel auxiliary units.

TWIN 400 hp. Cooper-Bessemers power the U. S. Army Engineer's survey vessel *Cavanaugh ex Helene;* 148 ft. long with a beam of 25 ft. and a gross of 406 tons. She was built at Bath, Maine, in 1931 and will make headquarters at



MODERN *Electrical* R.P.M. INDICATION
in both pilot house and engineroom



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Smooth, accurate R.P.M. indications have been made available for both the pilot and engineer by using the simple, electrical method. Only one engine-mounted magneto is required, with both indicators quickly and easily wired to it. And because of the absence of shafting and other mechanical parts, all readings will be *sure* . . . and maintenance will be kept *'way down.* For complete information on WESTON Electrical Tachometers consult the WESTON representative near you or write Weston Electrical Instrument Corporation, 579 Frelinghuysen Avenue, Newark, New Jersey.

WESTON *Instruments*

Seattle, Washington. A 3 cylinder, 85 hp. Cooper-Bessemer Diesel has been installed in the 52-ft. fishing craft *Blanco,* also of Seattle.

THE Superior Canning Company, Tanakee, Alaska, has repowered the 70-ft. cannery tender *Capt. Bing* with a 100 hp. Caterpillar marine Diesel with 3 to 1 reduction gear. Another Caterpillar Diesel, 135 hp., went into the 47-ft. tug *Ranger* owned by the Knappton Towboat Company, Astoria, Oregon.

NORTH VANCOUVER No. 5, a 150 passenger and auto ferry recently completed by the West Coast Salvage and Contracting Company, Vancouver, B. C., for the City of North Vancouver, is powered with a 8 cylinder 360 hp. Union Diesel, with two 18 hp. Russell Newbury Diesels as auxiliaries.

RECENT sales of engines in British Columbia, Canada, include a 135 hp. Atlas Imperial Diesel by the Sooke Harbor Fishing and Packing Co; an 85 hp. Gardner Diesel by E. P. Homer, Victoria; a 55 hp. Gray Marine Diesel by K. Miki, Sea Island; a 45 hp. Lorimer Diesel by Oscar Hansen for his troller *Sundown.*

ANNOUNCEMENT is made of the appointment of the Pacific Marine Supply Company, Seattle, Washington as exclusive distributor of Buda marine Diesel engines in the State of Washington and the Territory of Alaska. In addition, this company will handle the complete line of Buda marine engines, and Diesel and gasoline generator sets.

FAIRBANKS-MORSE Diesels have been installed in two more Pacific Northwest vessels; a 180 hp. engine in the new pilchard seine boat, a 73-footer, *Western Challenger,* built by W. R. Menchions and Co., Coal Harbor, B. C. for Capt. Charles Clark; and a 150 hp. repowering Cornell Towing Co.'s tug *Patty Mac,* Seattle, Washington.

MR. A. G. Mulkey has been appointed district manager of the newly opened branch sales office in the Vance Building, Seattle, Washington, by the Waukesha Motor Co., of Waukesha, Wisconsin. Assisting Mr. Mulkey is Paul E. Rabbach with the title of field-service engineer.

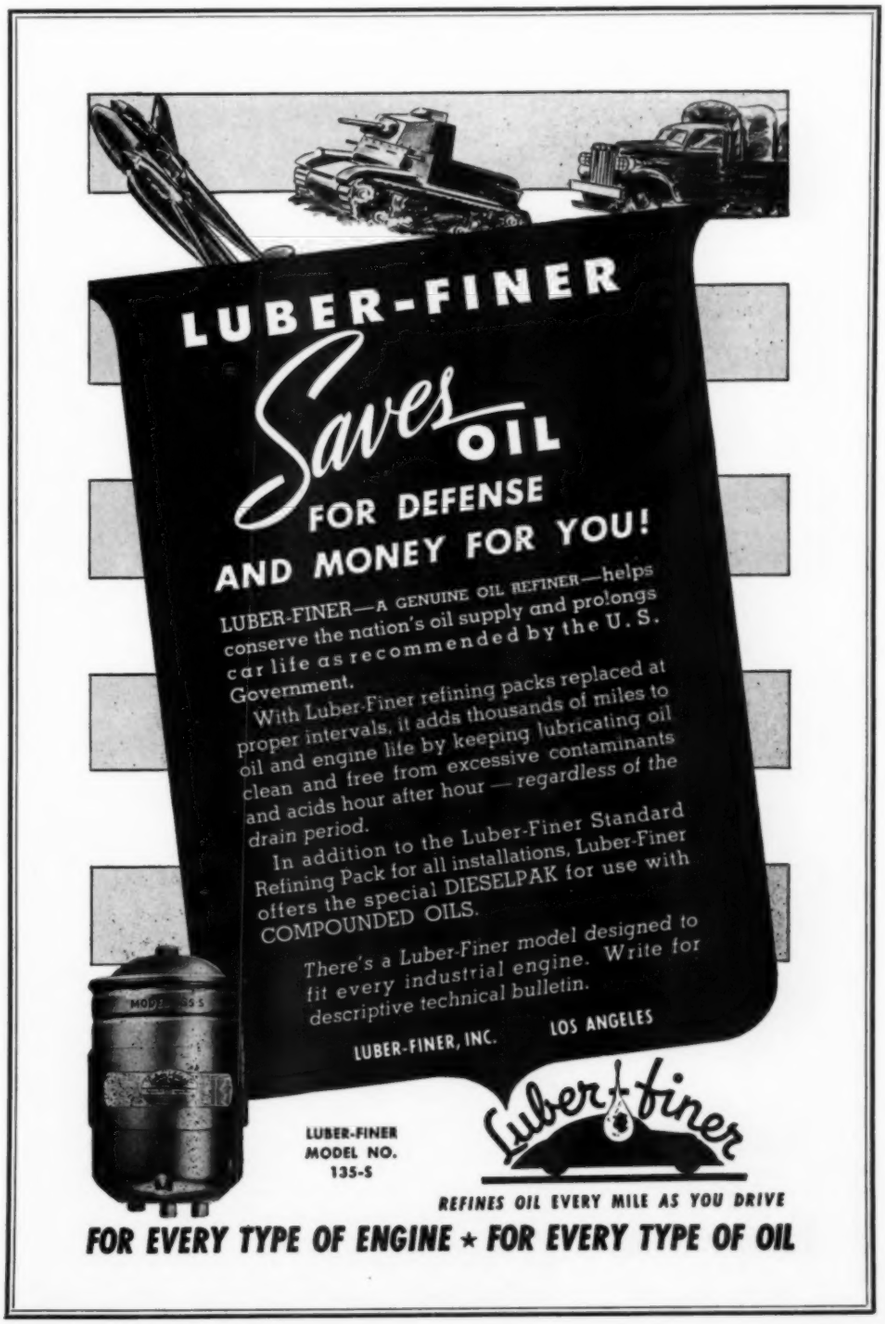
THE charter sportfishing boat *Sportfisher,* owner Capt. Buster Hyde, San Pedro, California, has been repowered with Caterpillar marine Diesel rated 115 hp. at 900 rpm. The Caterpillar replaces two gasoline engines in the 65-ft. craft.

THE 77-ft. herring seine boat *Cape Canso* built for the Canadian Fishing Co., by Pacific Shipyards, Vancouver, B. C., is powered with a 200 hp. Washington and has a speed of better than ten knots.

TWELVE 40-ft. motor sailers constructed by the Vic Frank Boat Co. and Olson and Winge, Seattle, Washington, are all powered with 83 hp. Gray marine Diesels with 2 to 1 reduction gears.

New Blackmer Hand Pump Metering Unit

THE details of a new hand-operated pumping unit were recently announced by J. B. Trotman, General Sales Manager of the Blackmer Pump Company, Grand Rapids, Michigan. This new unit, known as the BY-809 Hand Pump was designed primarily for industrial stock rooms, garages, service stations and other applications where oils, paints, solvents and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similar liquids are dispensed from under floor storage and where accurate measurement is important. Capacity of this new pump is 20 gallons per minute, at easy cranking speed. The dial face of the meter is calibrated in pints; one revolution of the hand indicating a quart. A reset device is provided for measuring quantities less than quarts. The drip pan, which is large enough to accommodate a five gallon container, is attached to the upright pump support and the drain pipe leads back into the storage tank. A flame-arresting, safety type strainer is provided in base of the drip pan. The pumping unit is a standard Blackmer geared type rotary pump of the well-known "Bucket Design" (swinging vanes) and is extremely easy turning.

* * *

IT is understood that the Navy Department has increased its award for the construction of tankers by the R. T. C. Shipbuilding Corp. from two vessels to three. These tankers measure 220 ft. x 37 ft. x 14.5 ft. and have a capacity of 12,800 barrels of oil.

Buda Hydraulic Diesel Nozzle Tester

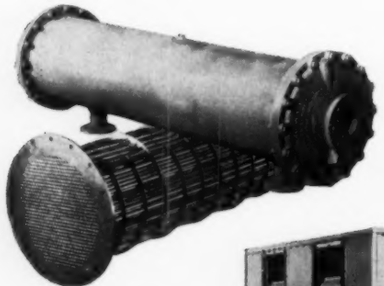
A DIESEL nozzle tester, embodying many advanced design features, is offered to engine manufacturers and operators by The Buda Company. Only 10¾" high and weighing but 12 pounds, the Buda nozzle tester may be permanently fastened to a work bench or if it is to be used on the road, it can be easily carried in a case specially designed for this purpose.

The unit is equipped with an oil reservoir having capacity for 20 to 25 testings, a nozzle connection with full range of adapters, an accurate pressure gauge calibrated up to 3,500 lbs. per sq. in., a two-way relief valve and a one piece, leak proof, body. For full particulars, write The Buda Company, Harvey, Illinois, requesting Bulletin 958-C.

GET EFFICIENT COOLING FOR YOUR DIESEL ENGINE

Whether or not you get a Diesel cooling system that's efficient depends on good engineering design. YOUNG gives you good engineering that includes the right type and size of cooling unit. Cooled-by-Young has come to mean ample cooling capacity together with durability and trouble-free performance. In addition to the five types of Diesel cooling units shown below, YOUNG manufactures Sectional radiators, Bus type coolers, Locomotive type radiators and Super-charger intercoolers. Write for catalogs and engineering data.

PRODUCT OF Young ENGINEERING AND MANUFACTURING SERVICE SPECIALIZING IN HEAT TRANSFER PRODUCTS



YOUNG HEAT EXCHANGER
Sturdy, compact, self-cleaning unit has cast housing and removable cooling unit.

YOUNG TUBE AND BUNDLE HEAT EXCHANGER
Specially designed — incorporates superior YOUNG features of construction.

YOUNG EVAPORATIVE COOLERS
For cooling engine or compressor jacket water, compressed gases or condensing vapors.

YOUNG ENGINE JACKET COOLERS
Designed for maximum cooling capacity with minimum power consumption. Eighteen different sizes.

YOUNG HEAVY DUTY RADIATORS
Rugged, streamlined — with one-piece cast iron shell and completely die stamped cooling unit.

YOUNG RADIATOR CO.
Dept. 232-B
Racine, Wisconsin

Young High Efficiency HEAT TRANSFER PRODUCTS

UNIT HEATERS • CONVECTORS • CONDENSERS • EVAPORATORS • AIR CONDITIONING UNITS • HEATING COILS • COOLING COILS

Young Quality

OIL COOLERS • GAS, GASOLINE, DIESEL ENGINE COOLING RADIATORS • INTERCOOLERS • HEAT EXCHANGERS ENGINE JACKET • WATER COOLERS

FOR DEFENSE

BUY UNITED STATES SAVINGS BONDS AND STAMPS

ON SALE AT YOUR POST OFFICE OR BANK

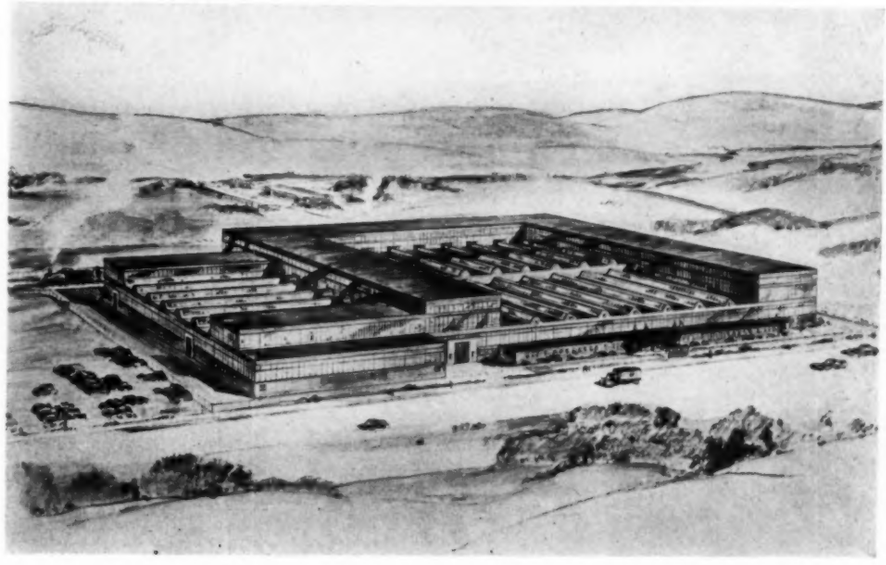
Edward L. Andrew Honored

TOP honor in industrial advertising as selected in the annual feature of *Industrial Marketing* goes this year to Edward L. Andrew, of Fuller & Smith & Ross, Inc., for the

series "Aluminum, Defense and You," written for the Aluminum Company of America. The award is an annual feature in the "O.K. As Inserted" department conducted for the magazine by "The Copy Chasers" and the individual selected is described as the "industrial advertising man-of-the-year."

Mr. Andrew, who is a vice-president of the agency, featured in the last year's copy the achievements of the Aluminum Company in the national defense program. Some of the outstanding developments described in the series were: expansion of aluminum production by Alcoa to a rate several times that of 1938, the last full peacetime year; completion of a major portion of the $215,000,000 expansion program which Alcoa financed entirely with its own funds; reduction of the aluminum ingot price to fifteen cents a pound, the lowest level of all time, and the company's temporary, but complete, foregoing of civilian markets built up over half a century. C. C. Carr, advertising director of the Aluminum Company and director of the Association of National Advertisers, was in charge of the series and with members of his department was instrumental in selection of copy themes.

FAIRBANKS, MORSE & CO. TO BUILD NEW DIESEL ENGINE PLANT. WILL EMPLOY APPROXIMATELY 1500 ADDITIONAL MEN



ANNOUNCEMENT has been made from the office of Colonel Robert H. Morse, President and General Manager of Fairbanks, Morse & Co. that a "letter of intent" has been issued by Secretary of the Navy, Frank Knox of Washington, authorizing the expenditure of 5½ million dollars for a new building and additional equipment and machinery at the Beloit, Wisconsin, works of the company.

The purpose of this new plant is to triple the production of Fairbanks-Morse Diesel engines

POWER TO TOW!

Why the O'BRIEN BROTHERS replaced a "SLOW-SPEED DIESEL" with a new MACK MARINER

• Bucking an incoming tide—or fighting a cross rip with a loaded barge in tow is a tough job for any engine and always a problem for tugboat captains.

But the O'Brien Brothers have the answer. Against the field they matched the sustained towing power—the continuous, low-cost service record of the first Mack they bought 18 months ago. *The answer*—they repowered boat number two with a new Mack Mariner.

Mack Marine Diesels range in size from 65 to 100 horsepower. Conservatively rated—built to "stand the gaff." Direct factory branch service at 28 tidewater and 14 fresh-water ports. Write Mack today for full details on the engine that's made to meet your needs.

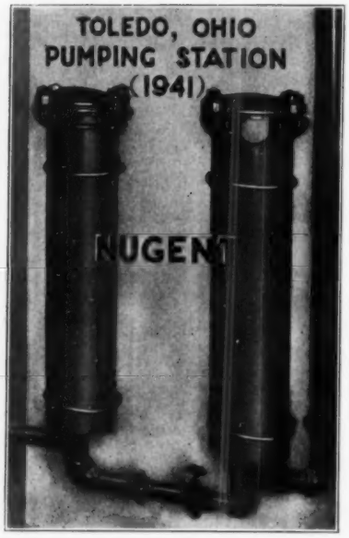
(above) Mack Mariner 605W, 100 sustained h.p., at 1500 r.p.m., for continuous service, powers the "O'Brien Kids"—out of Rosebank, Staten Island, New York. Operates in New York Harbor and vicinity. Owned by O'Brien Brothers Shipyards, Inc.

MACK MANUFACTURING CORPORATION, Marine Engine Division
Long Island City, N. Y.

MACK MARINE ENGINES ARE A PRODUCT OF THE BUILDERS OF WORLD FAMED GASOLINE AND DIESEL POWERED TRUCKS, BUSES, AND FIRE APPARATUS

NUGENT FILTERS

ON 2 SUPERIOR DIESELS



AT TOLEDO-LAKE ERIE WATERWORKS

• **"Install Nugent Filters and be sure that dirt troubles won't stop Diesel engine operation." . . . that slogan has been applied by scores of Diesel operators all over the country, for protecting both fuel and lube oil against dirt particles as small as .0003".**

One of the typical Nugent installations was made recently at the Toledo-Lake Erie Water Works, Toledo, O., where the two 900 hp. Superior Diesel Engines, shown at the right, above, furnish electric power. Both engines are protected against lube oil dirt trouble by two Nugent Absorbent Filters, shown at the left. Don't take a chance on power failure and down-time because of dirt . . . insist on Nugent fuel and lube oil filters. Write for information and literature.

Wm. W. Nugent & Co., Inc. Mfrs.

Oil Filters, Oiling and Filtering Systems, Telescopic Oilers, Oiling Devices
Sight Feed Valves, Flow Indicators, Compression Union Fittings, Oil Pumps, Etc.

415 N. HERMITAGE AVE. Established 1897 CHICAGO, U. S. A.

DEFENSE STRATEGY

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U. S. PAT. OFF.

• Making adequate service immediately available at the most important centers, is "Defense Strategy" because it helps to insure American industry's ability to produce more . . . faster. That's why the Twin Disc Clutch Company has continued to expand its service facilities until now they have:

7 factory-controlled branches manned by fully equipped field engineers ready to assist and advise you on any clutch or hydraulic drive problem.

30 parts and service stations, with competent help ready . . . will help you to prevent shut-downs or serious delays due to unforeseen accident or the breakage of any clutch part.

This extra protection is yours when you specify "Twin Disc Clutches."

TWIN DISC CLUTCH COMPANY, 1345 Racine St., Racine, Wis.

for the United States Navy—engines which at the present time are providing both propulsion and auxiliary power for U. S. Navy submarines, cruisers, destroyers, aircraft carriers and other sea power.

Terms of agreement between the Navy Department and the company call for completion of the huge plant, the installation of the machinery and equipment, and a large scale production of Marine Diesels in about a year's time.

In addition to the men required for the construction work and installation of the equipment, the project will mean the addition, in the near future, of at least 1200 to 1500 more factory employees to the company's present payroll. At the present time approximately 4500 men are working in the Beloit plant.

The new structure will have a length of about 660 feet and a depth of 460 feet, with a total floor space of more than 300,000 square feet. Contained in the new building will be a large machine shop, welding shop, storage facilities for raw and processed materials, assembly floor, erecting floor, test floor, painting and shipping departments, first aid hospital, conference rooms and offices, and suitable provision for production and planning departments and engineers. The building will be of concrete, brick and steel construction and its design and arrangement will conform to the latest engineering and production practices. The entire building and its machinery will be devoted to the manufacture of Fairbanks-Morse Diesel engines for the United States Navy.

Colonel Morse said, "Fairbanks, Morse & Co. has been one of the nation's biggest suppliers of primary and auxiliary propulsion equipment to the Navy and these products have been notably successful in meeting all the Navy's exacting requirements of performance and reliability."

★ ★ ★

THE Rockville Centre, Long Island, Municipal Diesel Plant sold its 825 hp. McIntosh & Seymour Diesel Engine, type 4-C46, direct-connected to 725 kva General Electric Generator, to A. G. Schoonmaker Company, 50 Church Street, New York City, who in turn has sold the unit for reinstallation in the Diesel plant of the City of Homestead, Florida. This plant now operates two 600 hp. McIntosh & Seymour Diesel engines.

Rockville Centre is replacing the unit sold with a new 3000 hp. Nordberg Diesel engine.

Korfund Steel Spring Vibro-Isolators

THE KORFUND COMPANY has recently issued a new bulletin, interesting and informative to Engineers and Industry. This eight-page bulletin, "Extra Machine Hours", is available for general distribution.

Prominent installations of the Korfund Type "S" series Vibro-Isolators are pictured. A wide range of marine and stationary applications are shown covering Diesel Engines and General Industrial Machinery. A chart concerning the rated capacities of this series is embodied in this bulletin for preliminary information.

Copies can be secured upon application to The Korfund Co., Inc., Long Island City, New York. Ask for Bulletin #Ba-32.

Falk Appoints Ralph Deihl Advertising Manager

THE Falk Corporation, Milkaukee, Wisconsin, manufacturers of commercial gears, speed reducers and flexible couplings announces the appointment of Ralph H. Deihl to the position of Advertising Manager.

Mr. Deihl was graduated from the Commerce School of the University of Wisconsin in 1936 and spent two years in the advertising department of the Bucyrus-Erie Company and two years in the advertising department of the National Enameling and Stamping Company, both in Milwaukee.

He joined the Falk Corporation in May, 1940, and has been handling the advertising of the company since that time.

New Office Created by Chicago Pneumatic

THE appointment of J. Rogers Davis as "Supervisor of Branches"—newly created office of the Chicago Pneumatic Tool Co., was recently announced by H. Arnold Jackson, President of the company, at its headquarters, 6 East 44th Street. Mr. Davis joined the company in December and will assist in the sales activities of Chicago Pneumatic's 21 District and Sub-district offices. He will standardize sales office procedure and coordinate sales plans and quotas with Branch and Division Managers.

Mr. Davis' many years of experience with a large equipment manufacturer make him well qualified to fill this new post. Among his various activities, he was an office manager in Philadelphia—later, operating from New York, he systematized operations of all branch offices and warehouses for an entire organization. An

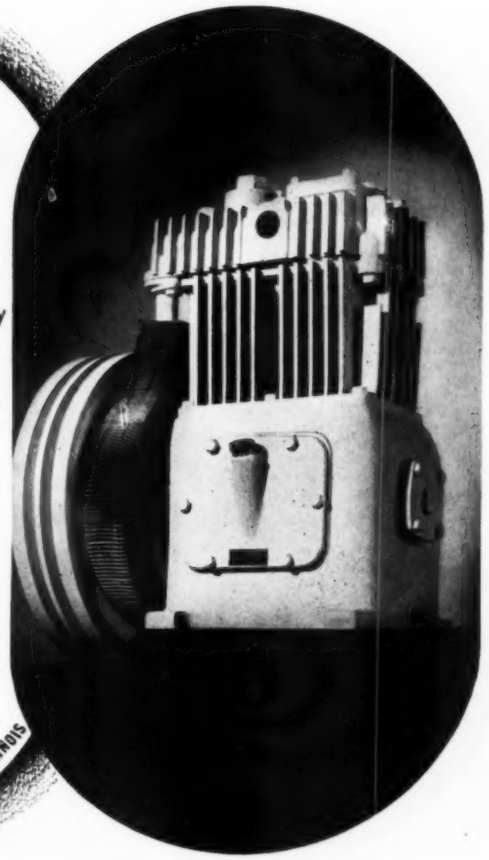
MODERN DESIGN

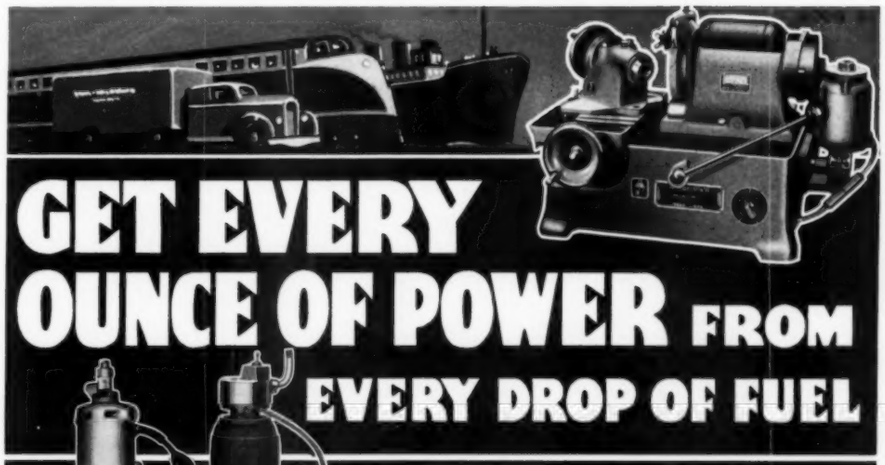
—index to Quincy's greater over-all efficiency

Construction is simpler. Radiation area is increased 12%. Lubrication is more thorough—more positive. Quincy Compressors have proved their dependability for starting and other services on hundreds of Diesel installations on land and sea. For services requiring intermittent pressures up to 500 lbs. per sq. inch. Make your next Diesel installation neater, more modern-looking, by specifying Quincy Compressors.

Quincy COMPRESSORS

QUINCY COMPRESSOR CO., 422 MAIN ST., QUINCY, ILLINOIS





GET EVERY OUNCE OF POWER FROM EVERY DROP OF FUEL

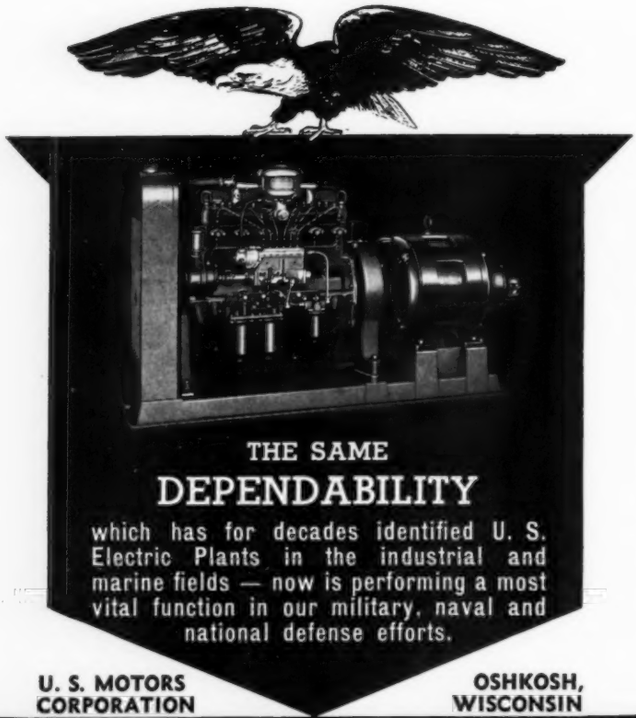
MODEL E-D

MODEL 4844

Waste must go! Keep your Diesels operating at maximum efficiency with maximum economy. Service valve seats with the HALL ECCENTRIC Grinder and valve faces with the HALL 80A wet type Valve Refacer with dual motors and rheostat control of workhead. That's the way to get the most power from the least fuel. Write for complete information.

THE HALL MANUFACTURING CO., TOLEDO, OHIO

HALL DIESEL TYPE ECCENTRIC VALVE SEAT GRINDERS

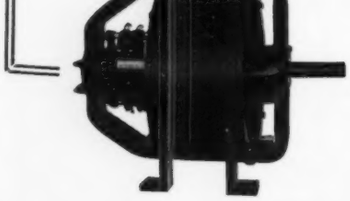

THE SAME
DEPENDABILITY
which has for decades identified U. S. Electric Plants in the industrial and marine fields — now is performing a most vital function in our military, naval and national defense efforts.

U. S. MOTORS CORPORATION — OSHKOSH, WISCONSIN

U.S. DIESEL ELECTRIC PLANTS

COLUMBIA

A.C. and D.C. GENERATORS



Dependable performance is one of the chief advantages of Columbia A.C. and D.C. Generators. They are designed and widely used for light and power service and are ideal for use as ship auxiliaries. They are light in weight, compact and can be furnished in single bearing type for direct connection to engines.

Columbia D.C. Generators range in size from 7½ to 200 KW, 36, 60, 125 and 250 volts and in speeds of 1750, 1450, 1150 and 850 R.P.M.

A.C. Generators sizes range from 1 to 300 KVA. Speeds: 1800, 1200, 900, 720, 600, 514 and 450 R.P.M. Single or three phase; direct connected or belted exciters.

Both A.C. and D.C. Columbia Generators are available for prompt shipment.

COLUMBIA ELECTRIC MFG. COMPANY
4519 HAMILTON AVENUE — CLEVELAND, OHIO

industrial engineer, he also has had broad experience in the preparation of catalogs and sales manuals.

While at present making an extensive tour of Chicago Pneumatic branches, Mr. Davis will make his headquarters at the company Head Office, 6 East 44th Street, New York. He officially assumed his new duties as "Supervisor of Branches" on January 1, 1942.

Intake or Exhaust Grille Jet

ILLINOIS Testing Laboratories, Inc., 420 N. LaSalle St., Chicago, offers a new intake or exhaust grille jet, developed for use with the Velometer. This jet has two calibrated air intake openings. One of these calibrated openings is at the end of the main member. This member forms a compensating tube and extends from the grille face outward from or beyond the critical suction zone; i.e., the zone where the air pressure changes most rapidly from static to velocity.

At right angles to this main member is a branch tube, also calibrated, to which is attached the flexible tube connecting the jet to the Velometer. The air actuating the Velometer movement is inspirated through this branch tube by the force of the suction exerted upon the main member or compensating tube.

This intake jet is offered in two sizes—low velocity of ⅝ inch OD tubing for full scale ranges of 0 to 1000 f.p.m. and high velocity of ⅜ inch OD tubing for scale ranges of 0 to 2500 f.p.m. and higher.

★ ★ ★

TWELVE tugboats have been ordered from the newly formed Pendleton Shipyards of Slidell, Louisiana, by the United States Maritime Commission. The dimensions are 185 ft. long, 37.5 ft. beam, and 21.5 ft. deep and these tugs will cost approximately $1,100,000 each. They will be propelled by Diesel main engines developing 2250 hp.

Construction of this yard has begun and it is expected that 1,500 employees will man the yard when it is in full production.

YOUR OIL IS AS GOOD AS NEW

• A Honan-Crane *"Continuous"* Oil Purifier will completely restore your Lube oil to its original lubricating property. This *"Continuous"* Oil Purifier is foolproof in operation and not only removes all abrasives and sludge but also the more dangerous varnishes and acids that are so destructive to your engines.

The Honan-Crane *"Continuous"* Oil Purifier is the most effective equipment you can use to purify either your Lube or Fuel Oil.

For full information write Dept. P

HONAN-CRANE CORPORATION

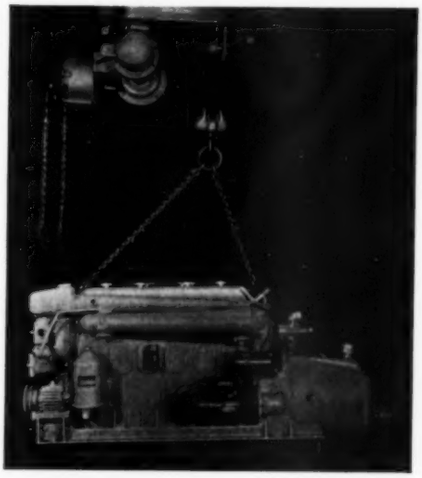
OFFICES IN PRINCIPAL CITIES

LEBANON, INDIANA

ADVANCED IN ENGINEERING AND DESIGN

Gray Marine Diesels

PRODUCTION of Gray Marine Diesels continues at full capacity while facilities have been more than doubled in the past year. Among the large users are the U. S. Army and U. S. Navy, also other departments of the U. S. Government, commercial workboat operators, and the larger boat builders. There is an increasing demand for these engines from South America and from the Far East, and many of the larger yachts built during 1941 used them. Five sizes are in production, all based upon the engine developed and built by General Motors, adapted and equipped for marine use by Gray. All have bore of 4¼ inches and stroke of 5 inches, basic cylinder size 71 cubic inches, using interchangeable parts. There are 24 separate models, and the range of sizes includes a single cylinder, 25 hp., 1,250 lbs; two cylinder, 55 hp., 1,350 lbs.; three cylinder, 82 hp., 1,755 lbs.; four cylinder, 110 hp., 2,060 lbs.; and six cylinder, 165 hp., 2,425 lbs. Built-in fresh water cooling system is standard on all models.

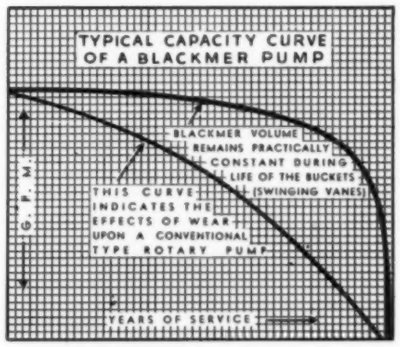


A special style of the six-cylinder Gray Marine Diesel as built for the U. S. Navy shows Bendix air pump for remote controls and welded steel base rails.

A new development is the production of high-output "Navy Style" engines, for operation up to 2,100 rpm. and delivering 225 hp. These engines are not available to the general public. Other developments include special engines with radiator cooling, built for the U. S. Coast Guard.

Gray Marine Diesels operate on the two-cycle principle, every stroke a working stroke, with corresponding savings in engine bulk. Vibration is eliminated by exact counterbalancing. There is conventional pressure-lubrication, and pistons are oil-cooled. Idling speed is governed.

This Kind of Pump
PERFORMANCE



gives a diesel installation GREATER DEPENDABILITY

BLACKMER
• ROTARY •
PUMPS

THE PUMP THAT IS SELF-ADJUSTING FOR WEAR
FAMOUS BUCKET DESIGN

No other pump has this important feature, that assures sustained peak volume during the life of the "buckets" (swinging vanes). When finally worn out, the "buckets" are replaced in 20 minutes, and cost but a few dollars. The pump is then restored to original efficiency.

Direct-Connected Pumps. Capacities 5-10-20 GPM. Pressures to 100 psi. Standard 1800 RPM motor. A very compact unit.

Reduction Geared Pumps 5 to 700 GPM single, up to 2800 GPM multiple. Pressures to 300 psi. All standard drives.

Rotary Hand Pumps 54 models —7 to 25 GPM. Thousands used as day-tank pumps on smaller diesel units.

BLACKMER ENGINEERING SERVICE

The services of Engineers from the Blackmer factory and district offices are available to plant management and designers anywhere in the U.S.A. or Canada. Your request will have immediate attention. There is no charge for this service.

Write for catalog and new Engineering Pump Bulletin containing helpful data on modern liquid transfer practice. *Free to pump users.*

BLACKMER PUMP COMPANY

1962 Century Avenue, S. W. Grand Rapids, Mich.

NAYLOR EXHAUST and INTAKE PIPE

—Cushions "PIPE JITTERS"

Here's pipe that's built to absorb vibration, shock loads, expansion and contraction—the only lightweight pipe that combines this advantage with strength, leak-tightness, safety and savings. Naylor's exclusive Lockseam Spiralweld structure provides a continuous expansion joint which makes this unique pipe ideal for diesel exhaust and intake pipe service. Sizes from 4" to 30" in diameter with all types of fittings and connections. Complete fabrication service.

Write for catalog or send specifications for quotation.

NAYLOR PIPE COMPANY
1765 EAST 92nd STREET • CHICAGO, ILLINOIS

WOODWARD GOVERNOR CO.
WORLD'S LARGEST AND EXCLUSIVE MANUFACTURERS OF HYDRAULIC GOVERNORS FOR PRIME MOVERS
ROCKFORD • ILLINOIS

KORFUND

Vibration Control
STEEL SPRINGS - CORK - RUBBER
KORFUND
COMPANY
48-28 THIRTY SECOND PLACE
LONG ISLAND CITY, N. Y.

CHECK YOUR FUEL SUPPLY AT A GLANCE

Write for Bulletin

THE LIQUIDOMETER CORP.
34 Skillman Ave., Long Island City, N.Y.

Unit injectors are used, located in the cylinder head in the same position as the spark plugs in a gasoline engine, and interchangeable. This system makes possible higher injection pressures, for extremely fine atomization of the fuel, eliminating the necessity for pre-combustion chambers. Advantages of this system are claimed to include a clear and odorless exhaust, because of complete combustion. Compression ratio is 16:1. Scavenging air is delivered under pressure from a Roots-type blower.

Generator capacities up to 1500 watts are available on standard engines. For reduction drive, a dual disc transmission unit is used, combining clutch and reverse gear with reduction gear. Independent clutches for each of forward and reverse provide a positive neutral and 100 per cent reverse ratio.

The single-cylinder and two-cylinder models are standard with reduction gear in ratios of 1.6:1, 2.4:1, and 3.2:1. The three, four and six are offered either for direct drive, or in reduction ratios of 1.5:1, 2:1, 3:1 or 4.4:1, for propeller speeds as low as 350 rpm. These are available on either rotation, and manifold may be either to port or starboard, excepting on the one and two cylinder engines which have port and starboard manifolds, respectively. Power take-off at front end is available in various ratios.

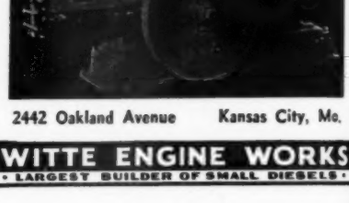
★ ★ ★

OF THE thirty-six coasters being built for the Maritime Commission, nine of them have been redesigned to give them greater tonnage and possibly greater speed. The Penn-Jersey type, instead of 1860 tons, will have a gross of 2160 tons and a draft nearly five feet greater than the twenty-seven other ships which are called "coasters." Comparison of the dimensions show the original design calling for vessels 250 ft. x 42 ft. 1 in. x 20 ft. 5 in., whereas the other ships are to be 255 ft. long, 42 ft. 6 in. wide, and 25 ft. 3 in. deep. The Penn-Jersey ships will be propelled by 1300 hp. Diesel engines.

Recently the John H. Mathis Company, Camden, N. J., completed the "Arthur Hoyt Scott" for the Scott Paper Company and the Commission has redesigned the nine coasters to the specifications for the Scott Paper Company's vessel. The design and size of the coasters make them desirable for work in restricted harbors. They are expected to be turned over to Great Britain under the lend-lease program upon completion.

Conserve Power Save Money
with **WITTE** DIESELECTRIC TRADE MARK REG. PLANTS

★ Now you need a WITTE Dieselectric Plant more than ever—*to conserve power for national defense*—to save you money by giving you electricity for 1c a K.W.H. Operate on cheap, non-explosive fuel. Rugged, compact, quality built for years of heavy-duty service. Easy to install, simple to operate.
3 to 10 K.V.A.—manual, electric or automatic control. Engineered according to the WITTE quality standards famous for 71 years.
WRITE now for free literature giving complete information.



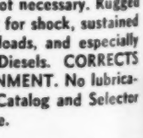
2442 Oakland Avenue Kansas City, Mo.

WITTE ENGINE WORKS
• LARGEST BUILDER OF SMALL DIESELS •

FUEL INJECTION EQUIPMENT
for installation by
DIESEL ENGINE BUILDERS
XLO
EX-CELL-O CORPORATION
Diesel Division
1200 Oakman Blvd. • Detroit, Mich.

CUTTING MORE TIME from DIESEL RECORDS!
DIESEL TIME SHEET
DISCONNECTION OF MACHINERY

SETTING OR TIMING any Diesel engine does not require tearing down coupling with
TYPE HQ
L-R Flexible Couplings



Either half of coupling rotates independently. Disconnection of machinery not necessary. Rugged sturdy coupling for shock, sustained or fluctuating loads, and especially designed for Diesels. CORRECTS ALL MISALIGNMENT. No lubrication required. Catalog and Selector Charts available.

LOVEJOY FLEXIBLE COUPLING CO.
4930 W. Lake St. Chicago, Illinois

WE ARE THINKING OF TOMORROW

War time production is American Industry's first duty, and it is the number one job today in our plant as in many others whose products are useful to the war effort.

But in the midst of this war production, research is constantly going on in the Maxim plant, research that will continue to improve the silencing equipment available to our customers. Then too the widely varying demands put on silencing equipment today have greatly increased the development of special types of silencing units, and it is significant that when a particularly difficult problem arises, when silencing equipment must be adapted to a new type of installation, Maxim is so often called upon to provide the answer.

This acceleration of specialized silencing applications will prove useful not only to our war effort but will open up wide new possibilities for more efficient silencing in marine and industrial use in the years to come—and today as in the past Maxim is doing a pioneering job in the development of these new applications of silencing equipment.

The Maxim Silencer Co.

94 Homestead Ave., Hartford, Conn.

MAXIM

New Cutting Compound of Unusual Characteristics

FOR use on milling, drilling, threading, and tapping machines and power hacksaws, D. C. Paste Cutting Compound has increased the life of tools four and five times under test. Diluted in water about 1 to 30 parts, this compound is clean to use and leaves no grease on the machine or work. It does, however, leave a slight protective film which prevents rust but can be removed, from parts to be plated, with hot or cold water. The mixture contains no sulphur and may be used in any machine without danger to bearings, it has no effect on rubber. It does not stain brass or aluminum parts and its use does away with the degreasing operation after machining. For full particulars write direct to D. C. Cooper Company, 22 E. 18th St., Chicago, Illinois.

★ ★ ★

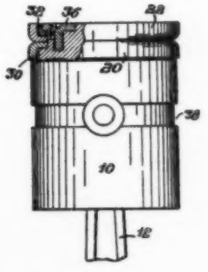
CONTRACT has been received from the Crown Central Petroleum Company for the Levingston Shipbuilding Company of Orange, Texas, to construct three barges, each to be 173 ft. x 39 ft. x 9 ft., and a tugboat to have dimensions of 74 ft. x 20 ft. x 9 ft., which will be powered with Diesel engines.

Latest Diesel Patents

A description of the outstanding patented inventions on Diesel and Diesel accessories as they are granted by the United States Patent Office. This information will be found a handy reference for inventors, engineers, designers and production men in establishing the dates of record, as well as describing the important Diesel inventions.

Conducted by C. CALVERT HINES*

2,229,040
PISTON CONSTRUCTION
Joseph A. Brockmeyer, Upper Darby, Pa., assignor to Rose M. Brockmeyer, Upper Darby, Pa.
Application February 6, 1940, Serial No. 317,462
1 Claim. (Cl. 309—14)



A piston for an internal combustion engine comprising, a lower portion of substantially the same diameter as the diameter of the cylinder in which the piston is to reciprocate, an upper threaded portion of a reduced diameter, and a stepped portion intermediate said threaded portion and said lower portion whereby two an-

* Patent Attorney, 811 E Street, N.W., Washington, D. C.

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nular, inwardly-recessed shoulders are formed one above the other, with the lower of said shoulders of a greater diameter than the upper shoulder, and with the upper shoulder of substantially the same diameter as said upper threaded portion, an integral lower collar of the same width as the width of and adapted to seat on said lower shoulder, said collar having a downwardly-extending resilient integral flange of a height substantially equal to the height of said lower shoulder, an upper collar of the same dimensions as and adapted to seat on said lower collar, said upper collar having an upwardly-extending resilient integral flange, the upper edge of said flange being flush with the upper edge of said threaded portion and an integral threaded ring of a thickness equal to the thickness of said upper threaded portion, said ring being adapted to engage said threaded portion and to seat within said upper flange to clamp said collar in position.

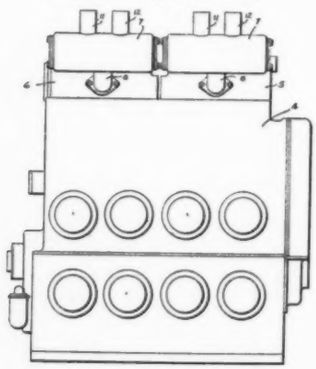
2,194,928

EXHAUST APPARATUS

William L. H. Doyle, Swarthmore, Pa., assignor, by mesne assignments, to The Baldwin Locomotive Works, a corporation of Pennsylvania

Application February 25, 1937, Serial No. 127,797

6 Claims. (Cl. 123—52)



1. A combined exhaust manifold and muffler for internal combustion engines comprising, in combination, longitudinally extending inner and outer walls radially spaced to form inner and outer passageways, the inner passageway being of shorter length than the outer passageway and the inner passageway having its most axially remote portions provided with open ends, a laterally extending engine connection communicating with the outer passageway, a laterally extending exhaust discharge passage communicating with the inner passageway and extending transversely through said outer wall to discharge to the atmosphere, and end plates closing the ends of said outer passage and axially spaced from the remote open ends of said inner passage.

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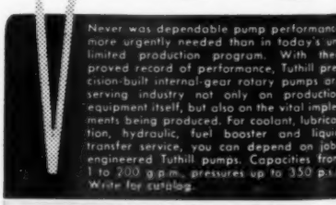

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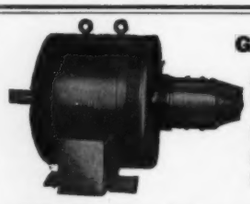

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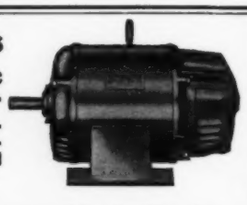

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American Bosch Corp.	63
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Atlas Imperial Diesel Engine Co.	2
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Brodie System, Inc.	63
Buckeye Machine Co.	63
Burke Electric Co.	64
Columbia Electric Mfg. Co.	58
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D. C. Cooper Company	63
Delco-Remy Division	1
Detroit Gasket & Mfg. Co.	62
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Elliott Company	Third Cover
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Erie Forge Company	3
Ex-Cell-O Corporation	60
Fairbanks, Morse & Co.	12-13
Fitzgerald Manufacturing Co.	62
General Machinery Corp.	5
General Motors Sales Corp.	32-33
Gray Marine Motor Co.	63
Gulf Oil Corporation	20
Hall Manufacturing Company	57
Holcomb Engineering Co.	64
Honan-Crane Corp.	59
Illinois Testing Laboratories, Inc.	49
Korfund Co.	60
Liquidometer Corp.	60
Lovejoy Flexible Coupling Co.	60
Luber-Finer, Inc.	53
Mack Manufacturing Corp.	55
Manzel Bros. Co.	62
Maxim Silencer Co., The	61
McCord Radiator & Mfg. Co.	63
Michiana Products Corp.	64
Nathan Manufacturing Co.	64
National Supply Co., The	21
Naylor Pipe Company	60
Nordberg Mfg. Co.	7
Norma-Hoffmann Bearings Corp.	63
Wm. W. Nugent & Co.	56
Penn Electric Switch Co.	50
Petrometer Corporation	63
Pickering Governor Co.	63
Pierce Governor Co.	17
Pittsburgh Equitable Meter Co.	64
Quincy Compressor Co.	57
Roots-Connersville Blower Corp.	51
Saginaw Malleable Iron Div.	19
A. G. Schoonmaker Co.	62
Sinclair Refining Co.	48
Socony-Vacuum Oil Co.	8-9
Star Electric Motor Co.	62
Staynew Filter Corp.	14
Superior Diesels	21
Texas Company, The	Second Cover
Thompson Products, Inc.	62
Tuthill Pump Company	62
Twin Disc Clutch Co.	56
U. S. Motors Corp.	58
Viking Instruments, Inc.	64
Waukesha Motor Company	11
Westinghouse Electric & Mfg. Co.	10
Weston Electrical Instrument Corp.	52
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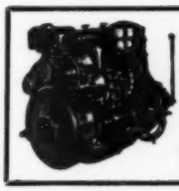

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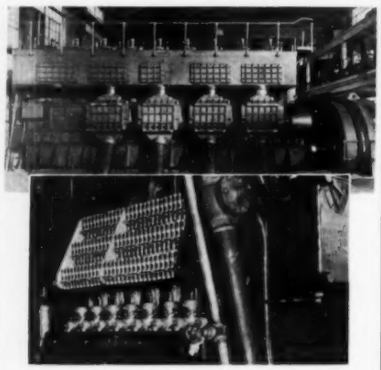

Upper view shows the new Busch-Sulzer 9 cylinder, 3060 hp. Diesel in the Freeport, L. I., Municipal light plant, equipped with Nathan Type P mechanical lubricators having a total of 86 feeds, shown in the lower illustration.

NATHAN

Nathan valveless mechanical lubricators are simple in design, positive in action and protect vital moving engine parts throughout the life of the unit. A separate piston is provided for each feed. The partial turning of the piston at its highest and lowest positions results in both suction and delivery action, thus eliminating suction and delivery valves. Pistons are actuated by an eccentric shaft and a lifting disc which impart positive motion in the simplest manner. Each oil feed is adjustable by means of regulating and lock nuts at the top of each piston.

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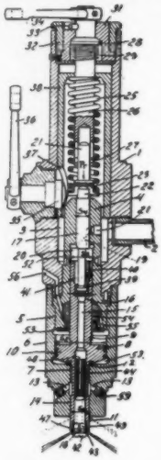
2,190,051
FUEL INJECTION
Jean Edouard Tuscher, Petit-Ivry, France
Application March 25, 1936, Serial No. 70,733
In France March 27, 1935
6 Claims. (Cl. 123—139)



1. A device for feeding fuel to internal combustion engines which comprises a housing having a chamber therein and a passage leading from the chamber to the exterior of the housing, means for admitting a predetermined quantity of fuel to said chamber, a piston movable in said chamber to force fuel under pressure through said passage, an exhaust port in a wall of the housing, a member including an exhaust passage movable in the housing by said piston to connect the chamber with said port, said member being normally held by the piston in position to close said port, and means for adjusting said member to vary the normal position of said exhaust passage with respect to the piston.

2,230,817
DIESEL FUEL
Bernard H. Shoemaker, Hammond, Ind., assignor to Standard Oil Company, Chicago, Ill., a corporation of Indiana
No Drawing. Application December 21, 1936, Serial No. 116,995. Renewed December 7, 1939
9 Claims. (Cl. 44—9)

1. The method of improving the ignition characteristics of a Diesel fuel comprising treating a Diesel fuel distillate with a mixture of sodium plumbite solution and sulfur in the presence of added mercaptan, said sulfur being used in quantities ranging from about 50% to about 350% in excess of the theoretical amount required to sweeten said distillate.

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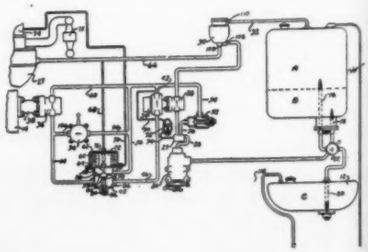
MICHIANA PRODUCTS CORP., Michigan City, Indiana

SAFETY CONTROLS
ALARM SYSTEMS
TACHOMETERS
FOR DIESEL ENGINES
VIKING INSTRUMENTS, INC.
Stamford, Connecticut

2,229,132
FUEL FEED SYSTEM
David Samiran, Fairfield, Ohio
Application July 26, 1938, Serial No. 221,435
11 Claims. (Cl. 158—36)
(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)



1. In a fuel feed supply system, a source of fuel supply, fluid driven pump means for supplying fuel from said source under pressure to a point of delivery, and a fluid pressure transmission circuit for regulating the supplying of an operating fluid pressure to said pump means as a function of the fuel pressure at the point of delivery, said circuit including a motor for operating said pump means, and a fluid pressure generator connected at its output with the input of said motor and being commonly communicatively connected at its input with the output of said motor and to said source at the input side of said pump means.